

AD-A238 254



2

# Foth & Van Dyke

Grassroots & Environmental Management Division

## Report

### LANDFILL SAMPLING & ANALYSIS

USARC, WEST SILVER SPRING DRIVE  
Milwaukee, Wisconsin

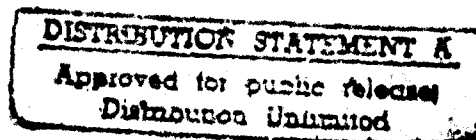
PREPARED FOR:  
**FORT MC COY**  
Sparta, Wisconsin

DTIC  
ELECTE  
JUL 10 1991  
S D D

PROJECT NO.: HA00916-6P

SCOPE I.D. #: 86M94

February 1988



**Foth & Van Dyke and Associates Inc.**

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

81 7 05 058

91-04108

# Foth & Van Dyke

February 23, 1988

86M94-3

Mr. Vincent Schettini  
Engineering Planning & Services Division  
Fort McCoy  
Sparta, WI 54656

Dear Mr. Schettini:

RE: Landfill Sampling and Analysis  
USARC, West Silver Spring Drive,  
Milwaukee, Wisconsin

Foth & Van Dyke is submitting ten copies of the report titled, *Landfill Sampling and Analysis, USARC, West Silver Spring Drive, Milwaukee, Wisconsin* dated February 1988. This investigation was conducted in accordance with the scope of work in Delivery Order #7.

If you have any questions, please contact us.

Sincerely,

FOTH & VAN DYKE

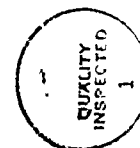
*Janis Schallhorn Kesy*  
Janis Schallhorn Kesy  
Project Hydrogeologist

*James C. Fahrbach*  
James C. Fahrbach, P.E.  
Director of Operations

JSK/JCF:psl

Enclosures

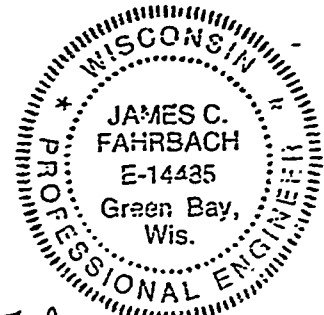
Accession #	
NTIS CR#	
DTIC TAB	
Unannounced	
Justification	
By	
Distribution	
Availability	
Dist	Avail
A-1	



Our Reputation Is Built On One Project . . . Yours

LANDFILL SAMPLING AND ANALYSIS

USARC, WEST SILVER SPRING DRIVE  
MILWAUKEE, WISCONSIN



February 23, 1988  
*James C. Fahrbach*

Prepared for:

FORT MC COY  
SPARTA, WISCONSIN

Prepared by:

FOTH & VAN DYKE and Associates Inc.  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisconsin 54307-9012

NOVEMBER 1987

**Foth & Van Dyke**

2737 S. Ridge Road  
P O Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

Copyright©, Foth & Van Dyke and Associates Inc.  
1988

## TABLE OF CONTENTS

	<u>PAGE</u>
EXECUTIVE SUMMARY.....	i
1.0 INTRODUCTION .....	1
2.0 SITE BACKGROUND .....	3
3.0 GROUNDWATER FLOW .....	4
4.0 GROUNDWATER SAMPLING PROCEDURES AND ANALYSIS .....	6
4.1 Introduction .....	6
4.2 Procedures .....	8
4.2.1 Field Procedures .....	8
4.2.2 Analytical Procedures .....	12
5.0 GROUNDWATER QUALITY ASSESSMENT .....	13
5.1 Introduction .....	13
5.2 Volatile Organic Compound (VOCs) .....	13
5.3 Inorganic Parameters .....	16
6.0 LANDFILL CAP ANALYSIS .....	22
6.1 Introduction .....	22
6.2 Field Procedures .....	22
6.3 Soil Tests .....	23
6.4 Cap Analysis .....	23
7.0 CONCLUSIONS AND RECOMMENDATIONS .....	27
7.1 Conclusions .....	27
7.2 Recommendations .....	27
REFERENCES .....	28



#### LIST OF TABLES

TABLE NO. 3-1	Groundwater Elevations.....	5
TABLE NO. 5-1	VOCs Detected and Sampling Points Where Detection Occurred During January 1987.....	14
TABLE NO. 5-2	WDNR Established PAL+ and ES+ for VOC Detected in Monitoring Wells.....	17
TABLE NO. 5-3	WDNR Established PAL+ and ES+ for Inorganic Parameters Analyzed.....	18
TABLE NO. 6-1	Summary of Cover Thickness and Type.....	24

#### LIST OF FIGURES

FIGURE NO. 1-1	Site Location Map.....	2
FIGURE NO. 6-1	Landfill Cap Profiles.....	26

#### LIST OF APPENDICES

APPENDIX A	Drawing No. C-2, 1 of 2  Groundwater Contour Map
APPENDIX B	Laboratory Results for Groundwater Analyses  B-1 Inorganic Parameters B-2 Volatile Organic Compounds (VOC)
APPENDIX C	Drawing No. C-2, 2 of 2  Topographic and Boring Location Map
APPENDIX D	Cap Boring Logs
APPENDIX E	Soil Testing Results

## EXECUTIVE SUMMARY

Foth & Van Dyke and Associates Inc. was retained by the U.S. Army Corps of Engineers to investigate the groundwater and the landfill cap at the USARC, West Silver Spring Drive, Milwaukee, Wisconsin. Five rounds of groundwater and surface water samples were collected from 15 monitoring points in the vicinity of the site. These samples were analyzed for selected organic and inorganic parameters.

Soil borings were drilled through the landfill cap on a 200 foot grid. Grain size (sieve and hydrometer) and Atterberg limits were determined on selected soil samples from the borings.

Our main conclusions of the investigation are:

1. Vinyl chloride exceeded NR 140 standards in five monitoring wells.
2. The vinyl chloride appears to be from a source other than the USARC landfill.
3. Chloride exceeded the PAL in four monitoring wells each during one sampling period.

Arsenic was detected in well P-109A at the PAL during one round.

Cadmium was detected in wells P-109A and OW-106B at over the PAL during the September sampling only.

The PAL for iron was exceeded in nine of the monitoring wells. The highest concentration of iron occurred in wells P-101A, P-102A, and P-105A.

Sulfate exceeded the PAL in eleven monitoring wells and the ES in one well (OW-111B). The wells with the highest sulfate concentration were P-108A, P-109A, P-105A, OW-111B, OW-101B, and P-101A.

4. The groundwater in the study area has been impacted. Iron, sulfate, and vinyl chloride occurred at elevated levels in numerous wells both upgradient and downgradient of the USARC landfill.
5. The landfill cap is inadequate. Approximately 75% of the cap has less than the two feet of clay required by Wisconsin Department of Natural Resources (WDNR).

## 1.0 INTRODUCTION

In December 1986, the U.S. Army Corps of Engineers, Omaha District retained Foth & Van Dyke to conduct a groundwater and landfill cap investigation at the USARC landfill. The USARC landfill is located at 4828 West Silver Spring Drive in the City of Milwaukee, Milwaukee County, Wisconsin (Refer to Figure No. 1-1).

This report titled *Landfill Sampling and Analysis; USARC, West Silver Spring Drive, Milwaukee, Wisconsin* presents the findings of the groundwater sampling and landfill cap soil borings. The investigations included five rounds of sampling from groundwater monitoring wells and surface water, analyses of the water samples, soil borings in the landfill cap and soil testing.

In this report we describe all field and laboratory procedures, present all field and laboratory data collected and an analysis of the data.

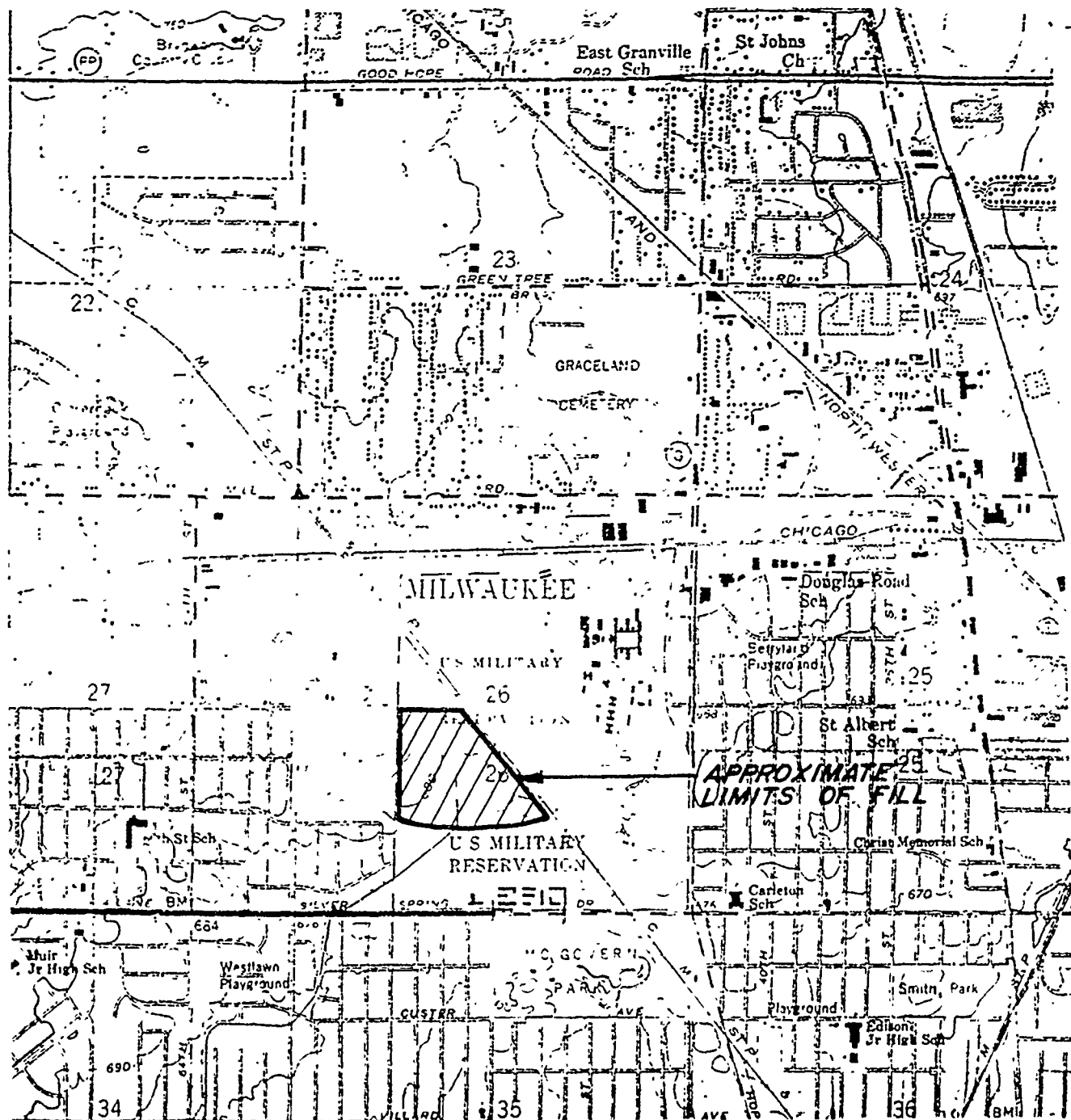


FIGURE NO. 1-1

FORT MCCOY, WISCONSIN

LANDFILL SAMPLING AND ANALYSIS, USARC  
WEST SILVER SPRING DRIVE, MILWAUKEE, WI

SITE LOCATION MAP

SCALE: 1:24000

DATE: 11/3/87

PREPARED BY: FOTH & VAN DYKE

BY: SAG

## 2.0 SITE BACKGROUND

Two areas of landfilling are known to exist on the USARC site. Another area of landfilling is documented north of the USARC site at the State of Wisconsin Havenswood Environmental Center (WDNR, 1986).

According to Donohue's report (1985), the Milwaukee Sanitation Department disposed of approximately 500,000 cubic yards of solid waste on the present complex site between 1957 and 1966. The waste deposited at the site was furniture, appliances, street sweepings, leaves, tin cans, bottles, ashes, cinders and sewer pipe. No industrial or hazardous waste was accepted. Also, no putrescible materials were accepted. The fill depth on the USARC site ranges from six to eight feet across much of the site, with depths of 12 to 14 feet in areas of the quarry ponds (WDNR, 1986).

### 3.0 GROUNDWATER FLOW

To examine the groundwater flow at the USARC site, water levels were measured in the on-site wells. Water level measurements were obtained during the groundwater sampling rounds. These water levels are shown in Table No. 3-1.

Water levels obtained on September 28, 1987, were used to construct the water table contour map (Refer to Drawing No. C-1, 1 of 2 in Appendix A). This water table contour map indicates that there is a water table high located in the south central portion of the site in the vicinity of well nest OW-108B/P-108A. Flow from this area moves outward towards the north, east and west. The landfill is most likely the cause of this groundwater mound. Flow on the western portion of the site (west of Lincoln Creek) appears to be to the south to southwest. Horizontal gradients at the site range from 0.003 to 0.02 ft/ft. To better define groundwater flow at the site, two to three more well nests would be needed.

Well nests OW-108B/P-108A, OW-111B/P-111A and OW-109B/P-109A indicate recharge conditions (downward gradients) occurring in this area. Wells OW-101B/P-101A, OW-102B/P-102A, OW-105B/P-105A and OW-106B/P-106A show slightly discharging conditions (upward gradients).

TABLE NO. 3-1  
Groundwater Elevations

Well #	Date Measured				
	1/27/87	3/25/87	5/26/87	7/28/87	9/28/87
OW-101B	675.58	675.89	676.64	675.35	676.21
P-101A	676.05	676.28	677.16	675.69	676.67
OW-102B	676.04	676.35	677.09	675.71	676.64
P-102A	675.95	676.20	676.95	675.59	676.56
OW-104B	680.67	677.32	678.22	676.13	677.24
OW-105B	670.84	670.84	671.58	670.80	671.39
P-105A	671.74	672.25	672.76	671.75	672.44
OW-106B	669.88	670.95	670.74	669.33	670.54
P-106A	670.06	670.65	670.73	669.97	670.78
OW-108B	686.25	687.61	688.09	685.52	687.63
P-108A	680.31	681.65	682.45	679.88	682.18
OW-109B	679.99	681.62	682.48	679.57	681.92
P-109A	679.59	681.08	681.80	679.13	681.36
OW-111B	681.26	683.31	684.15	681.26	683.66
P-111A	677.80	679.31	680.58	677.76	679.87



#### 4.0 GROUNDWATER SAMPLING PROCEDURES AND ANALYSIS

##### 4.1 Introduction

Twelve groundwater monitoring wells, two surface water points and one seepage point were sampled as outlined below in January, March, May, July and September 1987. These samples were collected to determine water quality near the old landfill at the USARC, West Silver Spring Drive, Milwaukee, Wisconsin.

The 12 groundwater monitoring wells sampled were:

OW-101B	OW-104B	P-108A
P-101A	P-105A	P-109A
OW-102B	OW-106B	OW-109B
P-102A	OW-108B	OW-111B

Two surface water samples were collected from Lincoln Creek, one upstream and one downstream of the landfill. A seepage point from the landfill to Lincoln Creek also was sampled. The seepage point was not sampled in January 1987. The seepage point was frozen in January and therefore, could not be located.

The water samples were analyzed for the following parameters:

field temperature	barium
field pH	chloride
field conductivity	sulfate
COD	chromium
BOD <sub>5</sub>	mercury
dissolved iron	lead

hardness	cadmium
total alkalinity	arsenic
nitrogen as $\text{NO}_2$ & $\text{NO}_3$	boron
ammonia as $\text{NH}_3$	color, odor, turbidity

The results of the analyses are in Appendix B.

Also, during the January sampling, all the sampling points were sampled for the following 32 VOCs:

benzene	1,1-dichloroethylene
bromoform	1,2-dichloroethylene
bromomethane	dichloromethane
carbon tetrachloride	1,2-dichloropropene
chlorobenzene	cis-1,3-dichloropropene
chloroethane	trans-1,3-dichloropropene
2-chloroethylvinyl ether	ethylbenzene
chloroform	1,1,2,2-tetrachloroethane
chloromethane	tetrachloroethylene
dibromochloromethane	toluene
1,2-dichlorobenzene	1,1,1-trichloroethane
1,3-dichlorobenzene	1,1,2-trichloroethane
1,4-dichlorobenzene	trichloroethylene
dichlorobromomethane	vinyl chloride
1,1-dichloroethane	trichlorofluoromethane
1,2-dichloroethane	dichlorodifluoromethane

During the July 1987, sampling round selected monitoring points were resampled for VOCs as outlined below:

<u>Well</u>	<u>VOCs</u>
OW-101B, P-102A, OW-102B	1,2-dichloroethylene vinyl chloride
P-101A, P-105A	vinyl chloride
P-108B	tetrachloroethylene
upstream, downstream	tetrachloroethylene 1,2-dichloroethylene

The VOC results are contained in Appendix B.

#### 4.2 Procedures

##### 4.2.1 Field Procedures

Sampling was performed in accordance with WDNR recommended sampling procedures. The sampling procedures used are outlined below:

1. The depth to water (DTW) and total depth (TD) of the monitoring well was measured using an electronic water level meter (Watermaker water level indicator, Johnson Division, UOP). The difference between these measurements is multiplied by 0.65 to calculate the volume (four static well volumes in gallons) to be purged from the well prior to sampling.

Sample calculation =

$$V \text{ purge} = (\pi r^2) (\text{TD-DTW}) (\text{conversion}) (4 \text{ volumes})$$

$$V \text{ purge} = (3.14) (1 \text{ in})^2 (\text{TD-DTW}) (1 \text{ foot}/12 \text{ in})^2 \\ (7.48 \text{ gal/feet}^3) (4 \text{ volumes})$$

$$V \text{ purge} = (0.65) (\text{TD-DTW})$$

If the standing water volume is six feet, the purging volume would be four gallons.

2. The purging volume was then removed from the well with a teflon bailer and nylon rope. The bailer and rope was rinsed completely with deionized water prior to purging.
3. After the monitoring well was purged, the groundwater sample was collected using a teflon bailer. The bailer was lowered and raised slowly and two, one-liter transfer bottles were filled with groundwater in a manner which limits sample aeration. When a VOC sample was taken, it was collected first. The sample for VOC analysis was placed in two 40 ml glass vials with teflon lined caps. When capped, the vial was free of air bubbles.
4. A portion of the sample was tested at the well for specific conductivity, pH and temperature. Color, odor and turbidity characteristics were also observed. A Lakewood Instruments Model PC combined pH/specific conductivity meter was used. This meter corrects

specific conductivity to 25°C and is calibrated at least once per sampling event for pH and specific conductivity. For pH, buffer solutions at pH 4, pH 7 and pH 10 are used during calibration. A standard laboratory thermometer (°C) was used to measure temperature.

5. Appropriate samples for indicator parameters and primary and secondary drinking water standards analysis were filtered through a 0.45 micron membrane. A Geotech 2.4 liter barrel filter tank, pressurized with nitrogen gas, was used to filter groundwater samples. The tank was rinsed thoroughly with about 500 ml of deionized water between each sample. A 0.45 micron four inch diameter nitro cellulose (Schleicher & Schuell, BA85) filter with a coarse prefilter (#24 glass, Schleicher & Schuell) was used. The filters were replaced between each sample. The samples were then properly preserved as outlined below:

<u>Parameter</u>	<u>Preservative</u>
Alkalinity	Cool 4°C
Hardness	HNO <sub>3</sub>
COD	H <sub>2</sub> SO <sub>4</sub>
BOD <sub>5</sub>	Cool 4°C
Dissolved iron	HNO <sub>3</sub>
Nitrogen as NO <sub>2</sub> & NO <sub>3</sub>	Cool 4°C
Ammonia as NH <sub>3</sub>	H <sub>2</sub> SO <sub>4</sub>
Barium (Ba)	HNO <sub>3</sub>
Chloride (Cl)	None
Sulfate (SO <sub>4</sub> )	Cool 4°C

Chromium (Cr)	HNO <sub>3</sub>
Mercury (Hg)	HNO <sub>3</sub>
Lead (Pb)	HNO <sub>3</sub>
Cadmium (Cd)	HNO <sub>3</sub>
Arsenic (As)	HNO <sub>3</sub>
Boron (B)	HNO <sub>3</sub>

The pH of the first sample filtered was checked with the pH meter to verify the amount of each acid (nitric or sulfuric) that must be added to attain a pH of <2. Bottles were then packed into a cooler along with freezer packs to maintain a temperature of 4°C.

6. All equipment used by Foth & Van Dyke was cleaned between wells by triple rinsing with distilled/deionized water to prevent cross contamination. A new bailing line was used for each well.
7. After collection, the samples were maintained under chain-of-custody for transportation of the samples to the laboratory. Samples were transported by vehicle to the chemistry laboratory at Foth & Van Dyke's Green Bay office within 24 hours after collection. The sample bottles were transferred from the shipping coolers into laboratory refrigerators for pre-analysis storage. VOC vials were packed in styrofoam coolers, containing a freezer pack and mailed to Enviroscan.

8. The samples from Lincoln Creek were collected by dipping the bottles into the Creek. The bottles were held with the mouth of the bottle upstream to allow the water to flow into the bottle.

The sample from the seepage point was collected by holding the bottle under the seep and allowing the water to flow into the bottle.

#### 4.2.2 Analytical Procedures

The VOC samples were analyzed at Enviroscan of Rothschild, Wisconsin. Sample analyses of priority pollutant volatile organics was done in accordance with EPA method 601 from Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater, EPA 600/4-28-057. A Verian Vista 6000 gas chromatographic equipped with photoionization (PID) and hall detectors in series along with a reporting integrator to integrate peak areas was used for the analysis.

The inorganic parameters were analyzed by Foth & Van Dyke's laboratory in accordance with the latest edition of Standard Methods for the Examination of Water and Wastewater.

## 5.0 GROUNDWATER QUALITY ASSESSMENT

### 5.1 Introduction

In January, March, May, July and September 1987, groundwater and surface water quality were analyzed in the vicinity of the USARC complex. The groundwater quality for both organic and inorganic parameters is discussed below.

### 5.2 Volatile Organic Compound (VOCs)

In January 1987, the 12 monitoring well samples and the two stream samples at the USARC site were analyzed for VOCs. In July 1987, six monitoring well samples and the two stream samples were analyzed for selected VOCs as outlined in Section 4.1. The seepage point sample was analyzed for VOCs in March 1987. The results of the VOC analyses are contained in Appendix B.

Six of the 12 monitoring wells sampled in January 1987, showed VOC detections. The wells with detections were OW-101B, P-101A, OW-102B, P-102A, OW-105A, and P-108B. There were low detections ( $\leq 1$  ppb) of VOCs in the upstream and downstream samples collected from Lincoln Creek.

Table No. 5-1 summarizes the VOCs detected and the sampling points at which the detections occurred.

The VOCs most often detected in the monitoring wells were 1,2-dichloroethylene and vinyl chloride. 1,2-Dichloroethylene was detected in three of the monitoring wells (OW-101B, OW-102B



TABLE NO. 5-1

VOCs Detected and Sampling  
Points Where Detections Occurred During  
January 1987

VOC	Sample Location
1,1-Dichloroethane	OW-101B, P-102A, OW-102B
1,2-Dichloroethylene	OW-101B, P-102A, OW-102B, Downstream
Trichloroethylene	OW-102B
Vinyl Chloride	OW-101B, P-102A, P-101A, OW-102B, P-105A
Toluene	P-108A, OW-109B
Tetrachloroethylene	OW-108B, Upstream, Downstream
Chloroform	Upstream, Downstream
Dichlorobromomethane	Upstream, Downstream

and P-102A). 1,2-Dichloroethylene concentrations ranged from 4.0 to 39.9 parts per billion (ppb). Vinyl chloride was detected in five of the monitoring wells (OW-101B, P-101A, OW-102B, P-102A and P-105A). Vinyl chloride concentrations ranged from 3.0 to 336 ppb.

The VOCs detected in both the upstream and downstream samples consisted of chloroform, dichlorobromomethane and tetrachloroethylene. The concentrations of these VOCs were, in general, the same in both the upstream and downstream samples. 1,2-Dichloroethylene was detected at 0.4 ppb in the downstream sample and not in the upstream sample. The seepage point sample analyzed in March 1987 had no detection of VOCs. The July 1987, VOC analyses were done on selected compounds to confirm these compounds presence in the groundwater and surface water. The July analyses confirmed the 1,2-dichloroethylene and vinyl chloride in the groundwater. 1,2-Dichloroethylene and tetrachloroethylene were not detected in the stream samples in July 1987.

Many of the low level detects (<1 ppb) of VOCs are believed to be false positive values for any of the following reasons:

1. Carry over during laboratory analysis.
2. Laboratory contamination.
3. Contamination during sampling.

For example, the 0.1 ppb toluene detected in OW-108A and OW-109B are most likely false positives picked up during sampling, since 0.2 ppb toluene was detected in the field blank.

Three of the VOCs detected in the groundwater at the USARC site have NR 140 preventive action limits (PALs) and enforcement standards (ESs) established by WDNR. These VOCs their PALs and ESs and the wells in which exceedances occurred are listed in Table No. 5-2. This table is based on the site having a design management zone (DMZ) of 300 feet or the property boundary whichever is less. Based on NR 140 there are no ES exceedances. All wells where VOC concentrations are greater than the ES are within the DMZ or the property boundary. Therefore, these exceedances are only exceedances of the PALs. Tetrachloroethylene concentrations exceeded the PAL in well P-108B in January and when resampled in July 1987 tetrachloroethylene was not detected. Therefore, this detection may have been a false positive. Dichloromethane was detected in one well at 0.3 ppb which is below the PAL of 15 ppb. Vinyl chloride exceeded the PAL (0.0015 ppb) in five monitoring wells (OW-101B, P-101A, OW-102B, P-102A and P-105A).

Vinyl chloride is a known carcinogen. The main application of vinyl chloride is as a monomer unit in plastics due to the high reactivity of the vinylic bond under process conditions. Vinyl chloride is used to make plastics, vinyl alcohol and resins.

### 5.3 Inorganic Parameters

In January, March, July and September 1987, groundwater samples from 12 site monitoring wells were analyzed for inorganic parameters (Refer to Appendix B.) Table No. 5-3 lists the inorganic parameters which have PALs and ESs established per NR 140. Also, listed in Table No. 5-3 are the wells in which exceedances occurred at least once during the five months of sampling. All wells except OW-104B are within the property boundaries. All other wells sampled are within the 300 foot DMZ except well OW-111B. Therefore, the only ES exceedances which could occur would be in wells OW-111B and OW-104B.

TABLE NO. 5-2  
WDNR Established PAL<sup>+</sup> and ES<sup>+</sup> for  
VOCs Detected in Monitoring Wells

VOC	PAL (ppb)	ES (ppb)	<u>Wells Exceeding</u>	
			PAL	ES
Tetrachloroethylene	0.1	1.0	P-108B	None
Dichloromethane	15.0	150	None	None
Vinyl chloride	0.0015	0.015	OW-101B	None
			P-101A	
			OW-102B	
			P-102A	
			P-105A	

PAL+ Preventive Action Limit  
ES+ Enforcement Standard

TABLE NO. 5-3

WDNR Established PAL<sup>+</sup> and ES<sup>+</sup> for  
Inorganic Parameters Analyzed

Parameter	PAL (ppm)	ES (ppm)	Exceedance of	
			PAL	ES
Chloride (Cl)	125	250	P-105A P-101A, P-102A	None
Nitrate-nitrogen (NO <sub>2</sub> & NO <sub>3</sub> -N)	2	10	None	None
Iron (Fe)	0.15	0.3	P-101A, P-102A, P-105A, OW-108B, OW-106B, P-108A, P-109A	None
Arsenic (As)	0.005	0.05	OW-101B, OW-102B P-109A	None
Barium (Ba)	0.002	0.02	None	None
Cadmium (Cd)	0.001	0.01	P-109A	None
Lead (Pb)	0.005	0.05	None	None
Mercury (Hg)	0.0002	0.002	None	None
Chromium (Cr)	.005	.05	None	None
Boron (B)				
Sulfate (SO <sub>4</sub> )	125	250	OW-101B, P-105, P-101A, OW-106B, OW-102B, OW-108B P-102A, P-108A, OW-104B, P-109A, OW-111B	OW-111B

PAL<sup>+</sup> Preventive Action Limit  
ES<sup>+</sup> Enforcement Standard

Chloride exceeded the PAL in four monitoring wells each during one sampling period. Chloride concentrations ranged from 5 to 200 ppm in the monitoring wells. In general, the highest concentrations of chloride occurred in wells OW-101B, P-101A, OW-102B, and P-102A. These wells are located north (upgradient) of the site.

The PAL for iron was exceeded in nine of the monitoring wells. Iron concentrations ranged from less than 0.10 ppm to 3.4 ppm. The highest concentrations of iron occurred in wells P-101A, P-102A and P-105A.

Sulfate ( $\text{SO}_4$ ) exceeded the PAL in 11 monitoring wells and the ES in one well (OW-111B). Sulfate concentrations ranged from 75 ppm to 560 ppm. The wells with the highest sulfate concentrations were P-108A, P-109A, P-105A, OW-111B, OW-101B and P-101A. These wells are located throughout the site area.

Arsenic was detected in well P-109A at the PAL (0.005 ppm), during one round. This detection occurred during the May round of sampling.

Cadmium was detected in wells P-109A and OW-106B at over the PAL (0.001 ppm) during the September sampling only. Barium, lead, mercury and chromium were not detected in any of the monitoring wells. There is not an established PAL for boron. The drinking water standard for boron is 1.0 ppm. Boron was detected at levels less than 0.6 ppm, in all wells.

Specific conductivity, hardness and alkalinity were highest in the northern wells, OW-101B, P-101A, OW-102B, P-102A and in the southern wells P-105A, OW-108A and P-108A.

BOD concentrations were between less than 6 ppm to 10 ppm. The majority of the wells had BOD concentrations less than 6 ppm.

The COD in the wells ranged from less than 5 ppm to 53 ppm.

Overall the inorganic parameters generally had higher values in the northern wells.

The upstream and downstream water quality in Lincoln Creek was analyzed. The data indicated that water quality upstream of the USARC landfill is similar to water quality downstream of the USARC landfill. Specific conductivity ranged from 443 to 975 umhos/cm upstream and from 490 to 1049 umhos/cm downstream. The concentration ranges for all parameters was similar upstream and downstream. This indicates that the landfill is not impacting the water quality in Lincoln Creek. All surface water data is contained in Appendix B. The concentrations of all the parameters tested, except for iron, are below the drinking water standards. In general the stream water quality is better than the groundwater quality.

A leachate seep located at the site was sampled in March, May, July and September 1987. The concentrations in the seepage sample were lowest in July and highest in September (Refer to Appendix B). Specific conductivity in the seepage samples was generally over 1,300 umhos/cm. The seepage point sample exceeded drinking water standards for iron, barium, mercury, lead, cadmium and boron during September 1987.

### Summary

Wells OW-101B, P-101A, OW-102B and P-102A are upgradient of the USARC landfill. Therefore, the vinyl chloride and elevated inorganic parameters in wells OW-101B, P-101A, OW-102B and P-102A are possibly the result of a source other than the USARC site. The vinyl chloride in P-105A also is possibly the result of a source other than the USARC site.

The inorganic parameters which exceed the PAL's in wells P-105A, OW-106B, OW-108B, P-108A, P-109A, OW-104B, and OW-111B, may be the result of the USARC landfill, natural background groundwater quality or other practices in the area.

The elevated inorganic parameters in P-105A and OW-106B are possibly a result of the USARC landfill and/or the Havenswood landfill. These wells are downgradient of both sites.



## 6.0 LANDFILL CAP ANALYSIS

### 6.1 Introduction

On February 24 and 25, 1987, 67 auger borings were drilled through the landfill cap. The borings were done at 200 foot intervals in a grid formation covering the entire landfill area. The WDNR letter of April 7, 1986, to the Department of the Army, 84th Division requested borings on a 100 foot grid. Per a telephone conversation between Foth & Van Dyke and Mr. John Krahling of the WDNR on February 23, 1987 the grid was increased to 200 foot centers. According to Mr. Krahling, if the extent of the landfill cap, soil type(s) and site boundaries could be defined, a 200 foot grid was sufficient. Drawing No. C-2, 2 of 2 in Appendix C shows the location of each of the cap borings.

### 6.2 Field Procedures

Each cap boring was advanced using a track mounted drill rig B-55. All the cap borings were performed by Wisconsin Test Drilling, Inc. of Schofield, Wisconsin. The borings were drilled using 4 1/4 inch continuous flight augers. Each of the borings was logged by a Foth & Van Dyke hydrogeologist as to the soil type(s) and thickness of the cap material. Each boring was backfilled with granular bentonite. The log of each boring is contained in Appendix D.

### 6.3 Soil Tests

Soil tests consisting of grain size (sieve and hydrometer) and Atterberg limit analyses were done on 25 of the cap soil samples. The results of these soil tests are contained in Appendix E. The soil test results are also reported on the boring logs in Appendix D.

### 6.4 Cap Analysis

Table No. 6-1 is a summary of the cover thickness at each boring location. The cover thickness at each boring is also shown on the boring location map, Drawing No. C-2, 2 of 2, in Appendix C. Five profiles of the landfill cap were drawn and are shown on Figure No. 6-1.

Approximately 75% of the landfill site has less than the two feet of clay landfill cover required by NR 180. Approximately 50% of the site has one foot or less of cover material. In many portions of the site refuse such as concrete, wood and metal is exposed. The landfill cap is damaged in many areas due to tanks and heavy equipment traffic. Some areas of the site especially on the east side of Lincoln Creek have only cinders on the surface for cover.

TABLE NO. 6-1

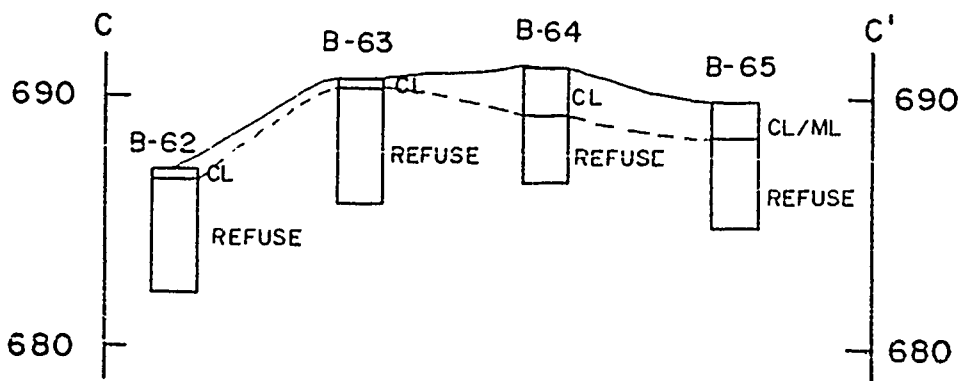
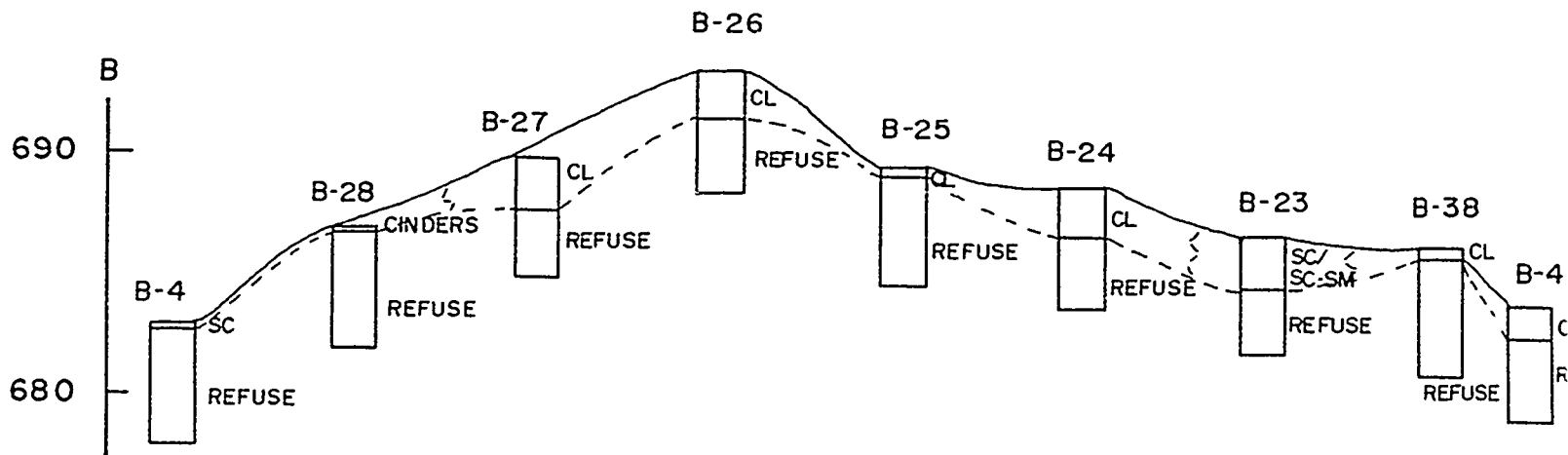
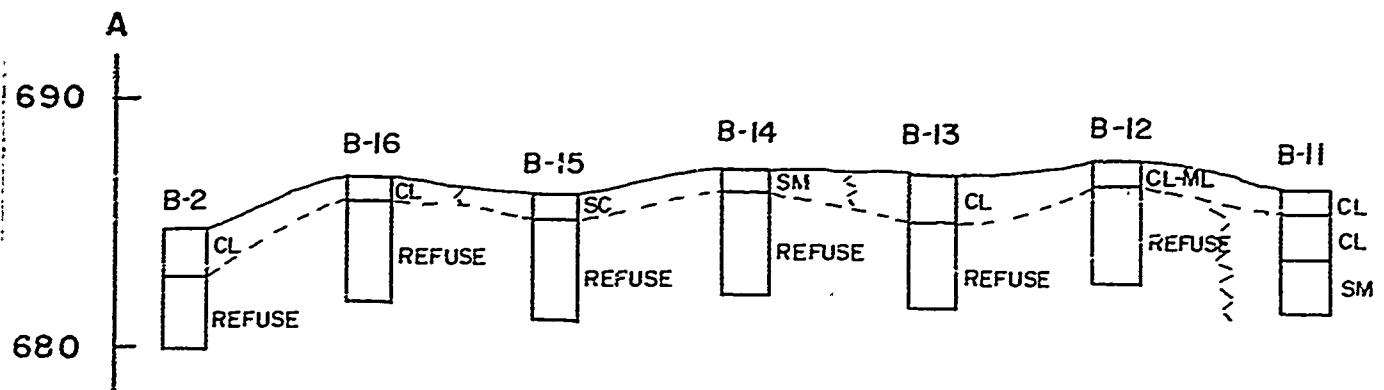
## Summary of Cover Thickness and Type

Boring #	Ground Surface Elevations	Cover Thickness	Type of Cover Material
B-1	685.20	(No Refuse)	--
B-2	685.40	2'	CL
B-3	683.90	1'	SM
B-4	683.22	0.5'	SC
B-5	684.05	2'	CL-ML
B-6	681.47	3'	CL
B-7	678.55	2'	CL
B-8	681.80	1'	CL-ML
B-9	682.73	(No Refuse)	--
B-10	680.70	(No Refuse)	--
B-11	685.09	(No Refuse)	--
B-12	688.14	1'	CL-ML
B-13	687.60	2'	CL
B-14	687.79	1'	SM
B-15	686.54	1'	SC
B-16	687.03	1'	CL
B-17	687.76	0.3'	Cinders
B-18	688.95	0.3'	Cinders
B-19	690.54	0.25'	SC
B-20	689.27	0.5'	CL
B-21	687.46	1.5'	CL
B-22	685.01	1.5'	SC
B-23	687.09	2'	SC/SC-SM
B-24	688.69	2'	CL
B-25	689.75	0.25'	CL
B-26	693.92	2'	CL
B-27	689.91	2.5'	CL
B-28	687.34	0.25'	Cinders
B-29	681.68	2'	CL-ML
B-30	688.30	0.5'	CL
B-31	691.71	0.5'	CL
B-32	690.65	(No Refuse)	--
B-33	688.66	0.5'	SP
B-34	688.28	0.5'	CL
B-35	686.15	0.5'	SP
B-36	684.46	0.5'	SC
B-37	682.88	0.25'	SC

TABLE NO. 6-1 (Continued)

Boring #	Ground Surface Elevations	Cover Thickness	Type of Cover Material
B-38	686.19	0.25'	CL
B-39	682.88	0.25'	CL
B-40	680.99	0.5'	SC
B-41	684.01	1.5'	CL
B-42	688.96	(No Refuse)	--
B-43	689.09	(No Refuse)	--
B-44	682.12	(No Refuse)	--
B-45	686.48	0.25'	CL
B-46	690.06	0	No Cover
B-47	690.12	0.16'	CL
B-48	693.45	0	No Cover
B-49	692.11	0	No Cover
B-50	688.89	0	No Cover
B-51	687.72	1'	CH/MH
B-52	691.08	0.5'	CL
B-53	693.17	0	No Cover
B-54	694.30	0.5'	CL
B-55	694.14	0.5'	CL
B-56	692.72	1.5'	CL
B-57	693.23	3'	CL
B-58	692.24	1.5'	CL/ML
B-59	691.65	2'	CL
B-60	690.16	2'	MH/CH
B-61	687.69	3'	CL
B-62	687.39	0.5'	CL
B-63	691.02	0.25'	CL
B-64	691.55	2'	CL
B-65	690.19	1.5'	CL/ML
B-66	688.17	0.5'	CL
B-67	690.30	0.5'	CL

A



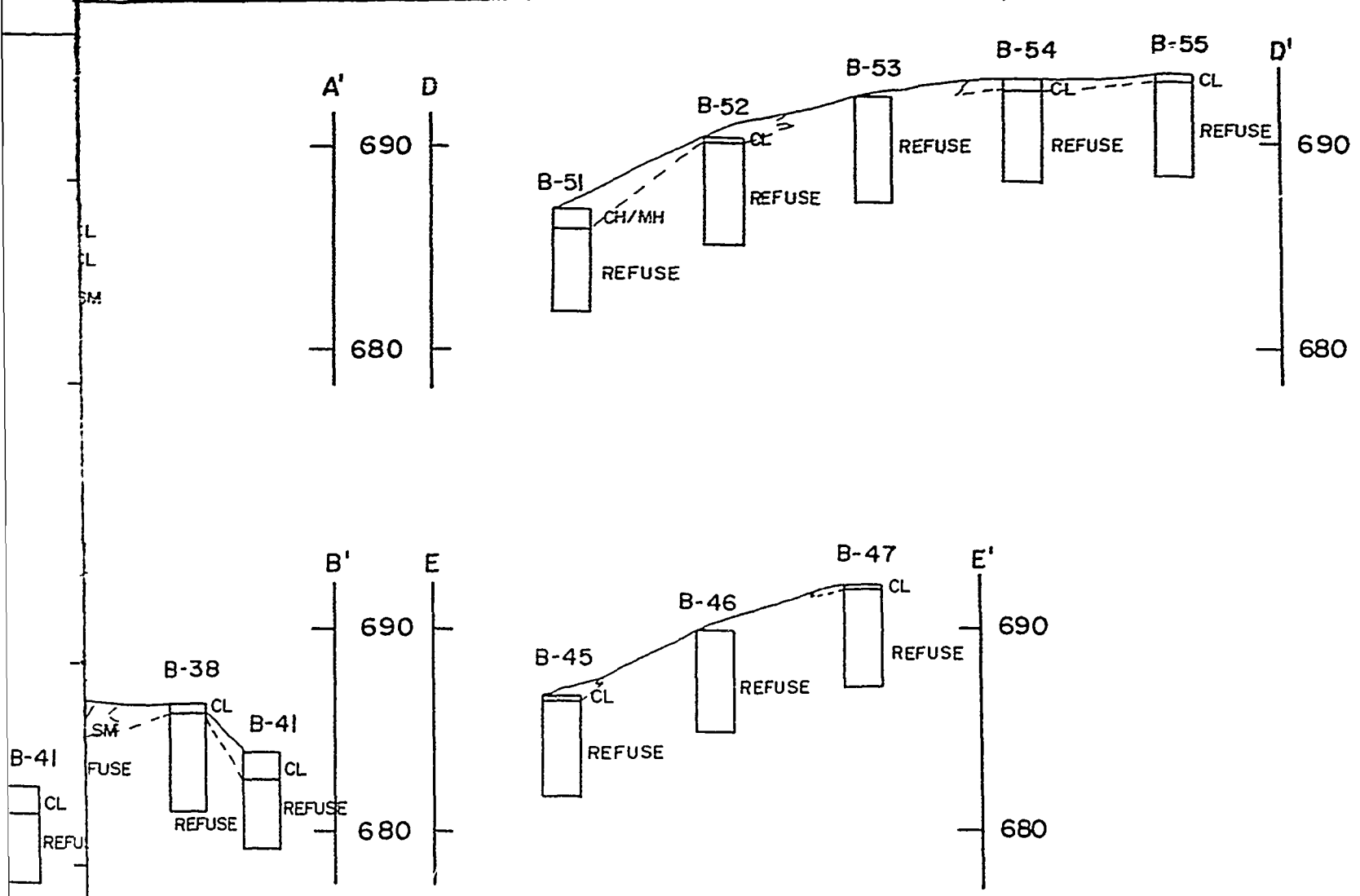


FIGURE NO. 6-1

FORT Mc COY, WISCONSIN	
LANDFILL SAMPLING AND ANALYSIS; USARC WEST SILVER SPRING DRIVE, MILWAUKEE, WI	
LANDFILL CAP PROFILES	
SCALE: HOR. 1"=200' VERT 1"=8'	DATE: NOV 4, 1987
PREPARED BY: FOTH & VAN DYKE	BY: SAG

## 7.0 CONCLUSIONS AND RECOMMENDATIONS

### 7.1 Conclusions

Vinyl chloride was detected in five groundwater monitoring wells at the landfill. Since four of the monitoring wells with the vinyl chloride detects are upgradient of the USARC site it appears that a source other than the landfill is responsible for the presence of vinyl chloride in the groundwater.

The groundwater at the landfill site has been impacted. The parameters with elevated concentrations are hardness, sulfate and iron. With the exception of vinyl chloride and sulfate, other parameter concentrations in the groundwater pose no threat to human health or the environment.

The landfill cap is inadequate. The present cap does not meet the minimum two feet of clay cover required by WDNR.

### 7.2 Recommendations

Based on the results of the investigation, Foth & Van Dyke recommends the following:

1. Prohibit the use of tanks and other heavy equipment on the landfill cap so as not to do further damage to the existing cap.
2. Install two to three additional well nests to further define groundwater flow in the vicinity of the site.

#### REFERENCES

Wisconsin Department of Natural Resources, April 17, 1986,  
Correspondence to Department of the Army RE: Silver Spring  
Landfill.

Donohue, 1985, Landfill Impact Evaluation, USAR Center Complex  
and Training Area, Milwaukee, Wisconsin.



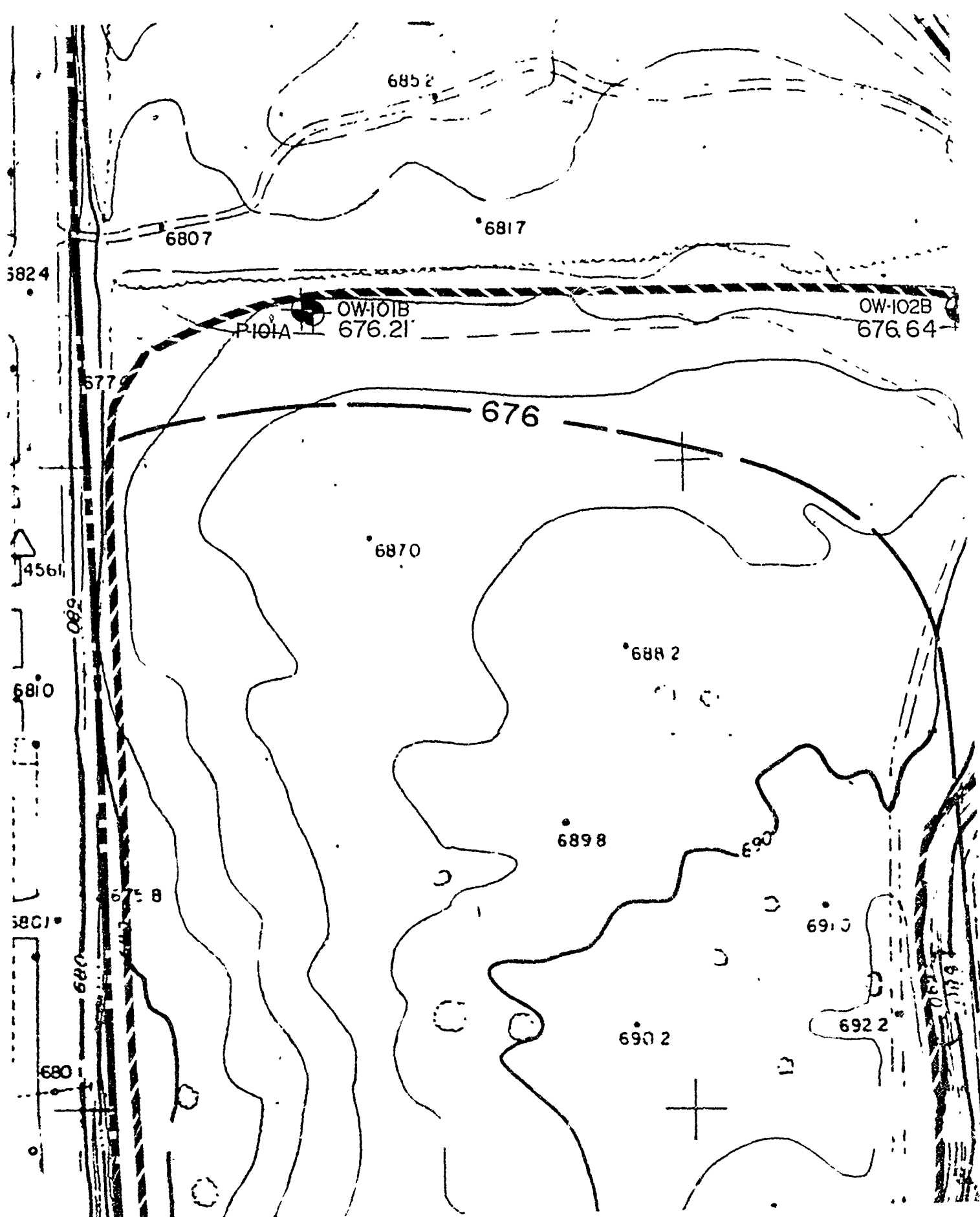
APPENDIX A

Drawing No. C-2, 1 of 2  
Groundwater Contour Map

(A)

2,539,000 E

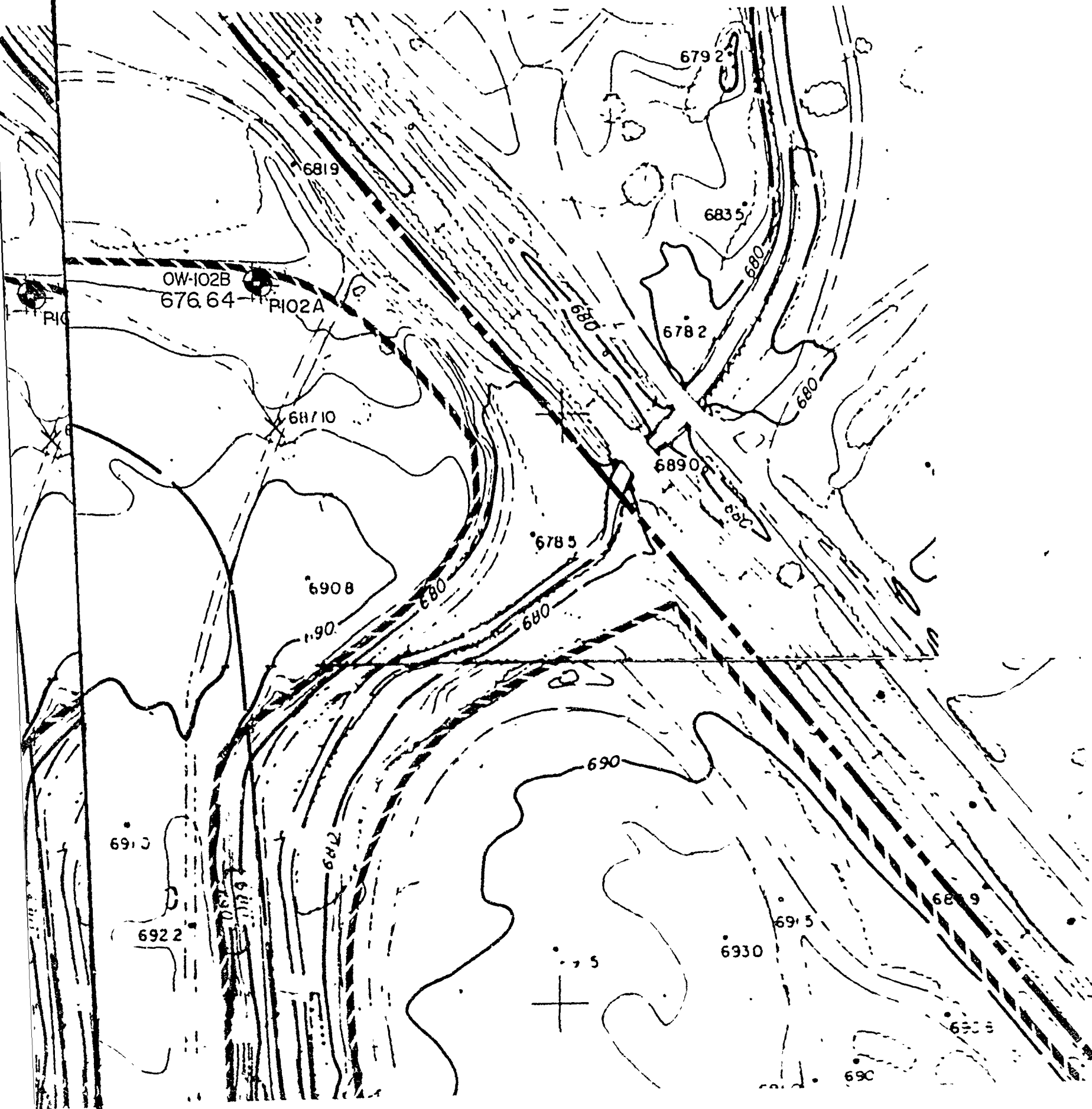
2,539,500 E



(b)

2,540,000 E

2.5

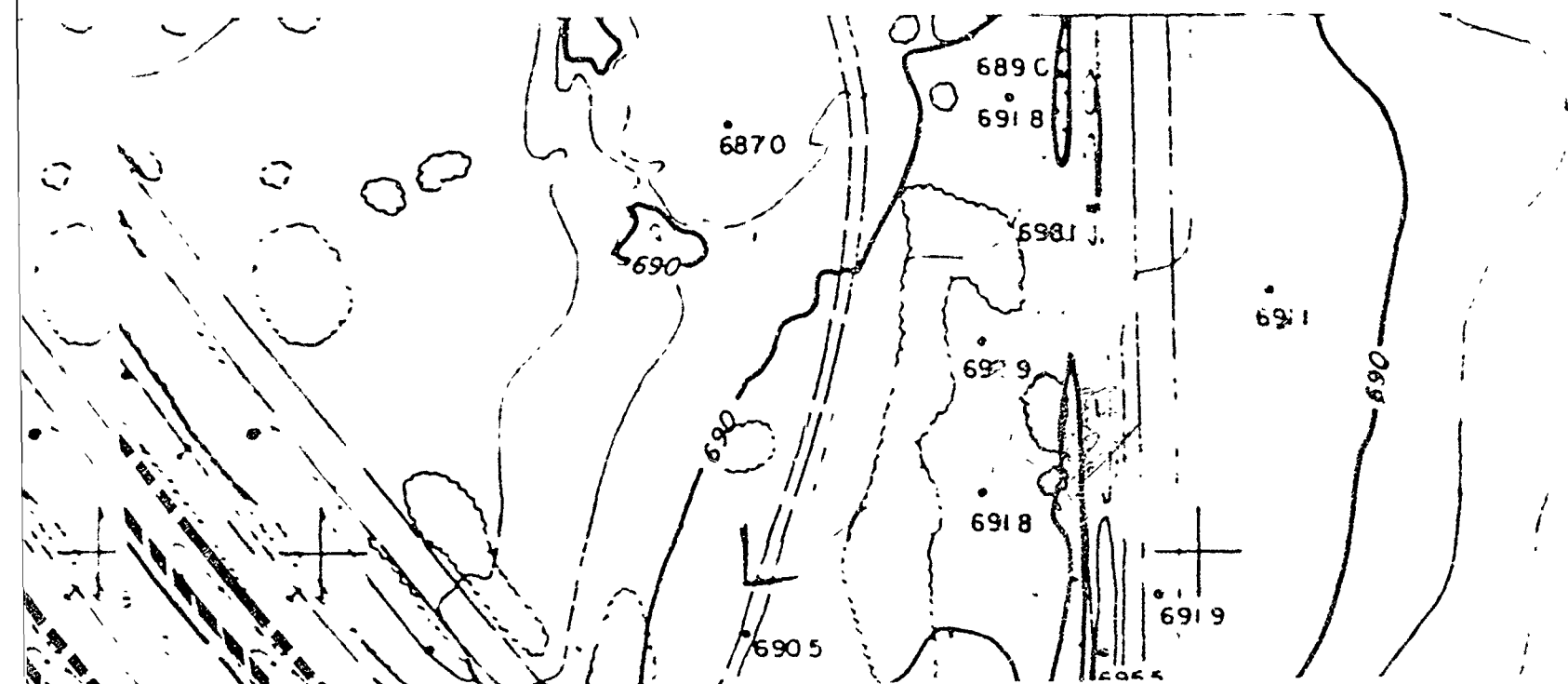


(C)

2,540

2,540,500 E

2,541,000 E



(D)

N

417,000 N

# LEGEND

—690—

• 691.8

—680—

—680—

—680—

—680—

—680—

—680—

—680—

—680—

—680—

—680—

EXISTING DRAIN  
EXISTING DRAIN  
TREES OR GROUN  
EXISTING DRAIN  
RAILROAD TRACK  
APPROXIMATE  
APPROXIMATE  
EXISTING DRAIN  
AND MEASUREMENT  
DRAIN  
GROUNDWATER CO  
GROUNDWATER FLO

416,500 N

690

UWIC  
676.21

0015

(L)

N

1

2

3

N

# LEGEND

— 690 —

• 691.8

— 680 —

— 680 —

— 680 —

676.21

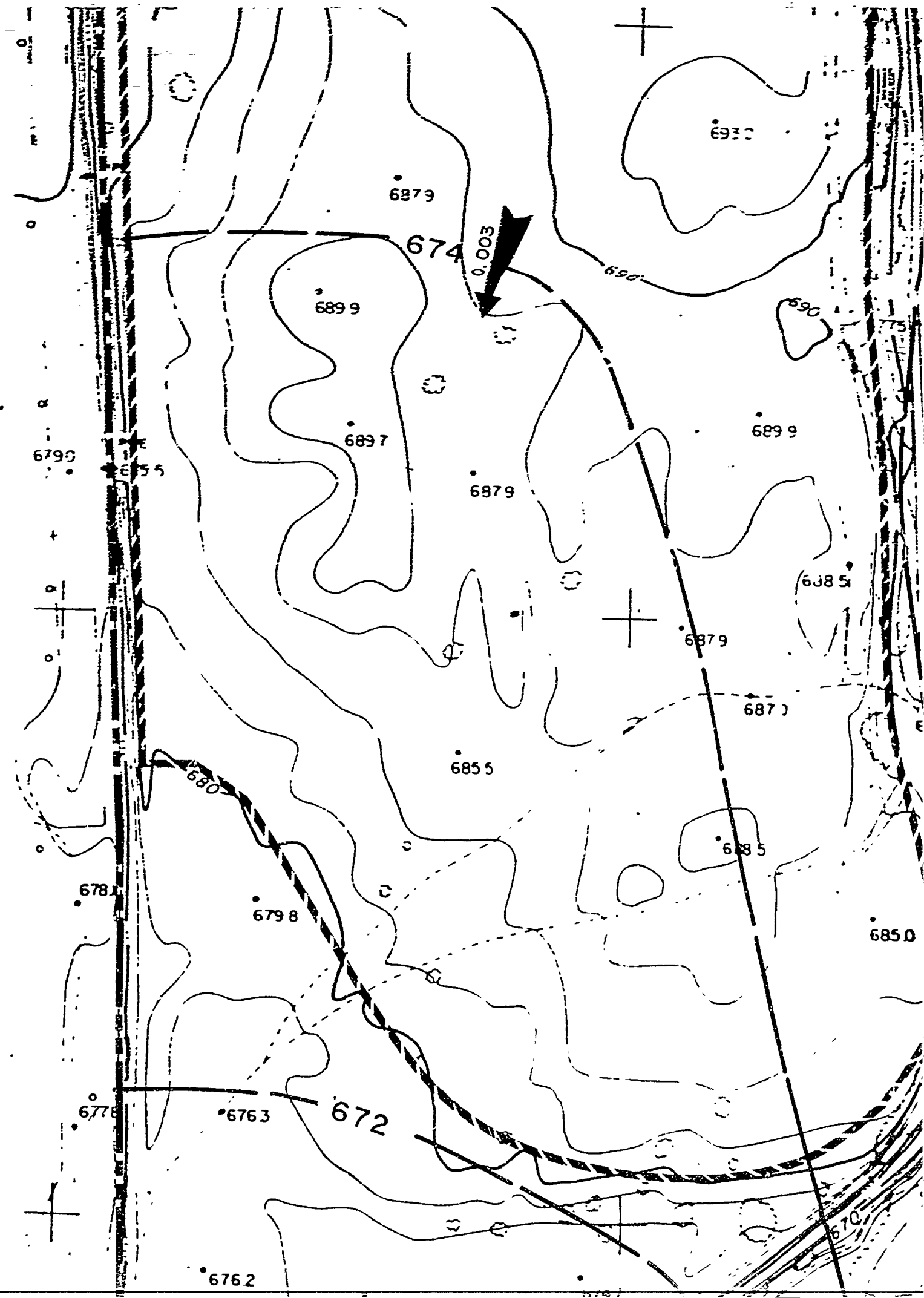
— 680 —

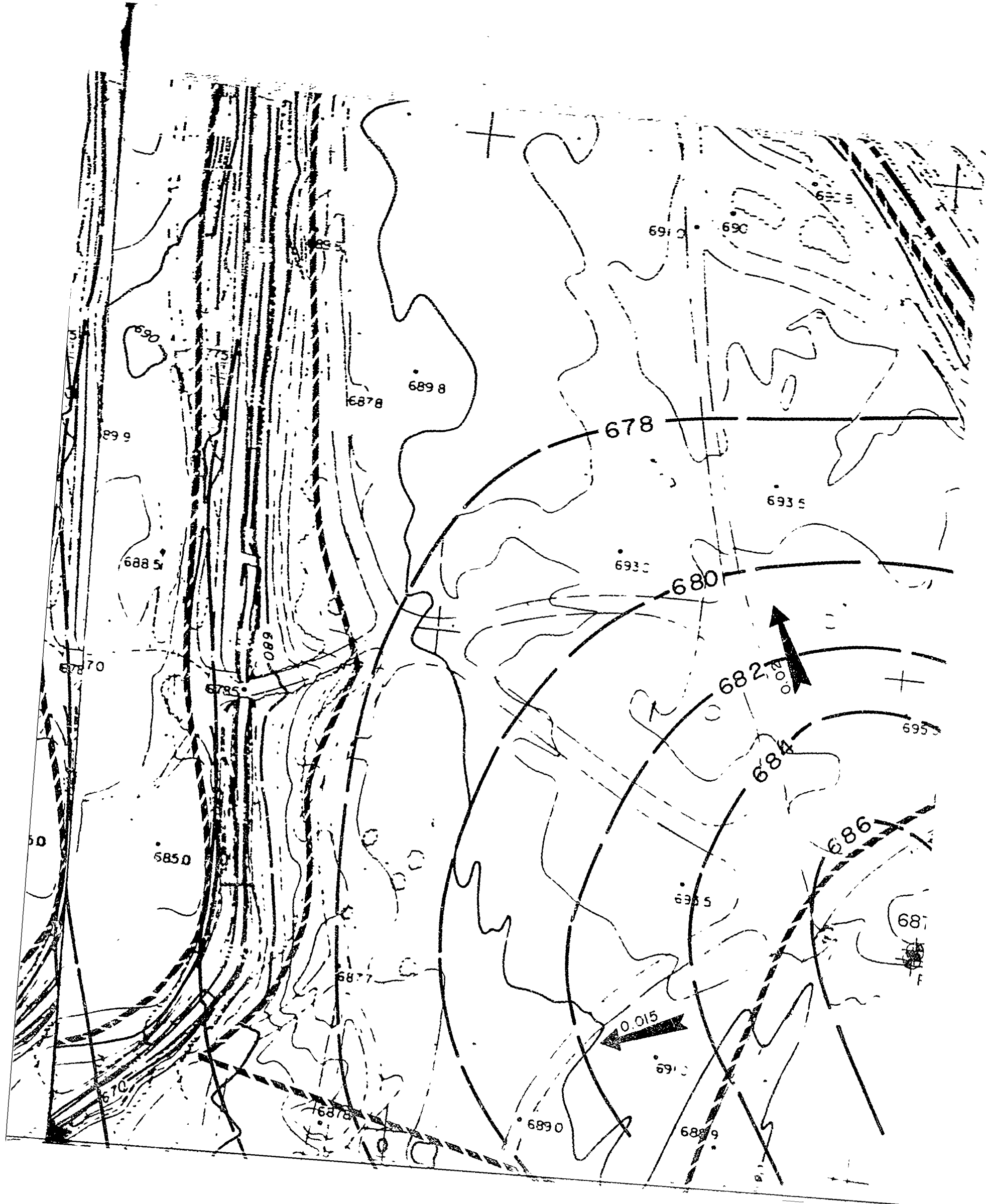
— 680 —

- EXISTING GROUND CONTOUR
- EXISTING WATER ELEVATION
- TREES OR BRUSH
- EXISTING IMPROVEMENTS
- RAILROAD TRACKS
- APPROXIMATE GROUND ELEVATION
- APPROXIMATE GROUND ELEVATION
- EXISTING WATER ELEVATION LOCATION AND MEASUREMENT
- DRY
- GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION

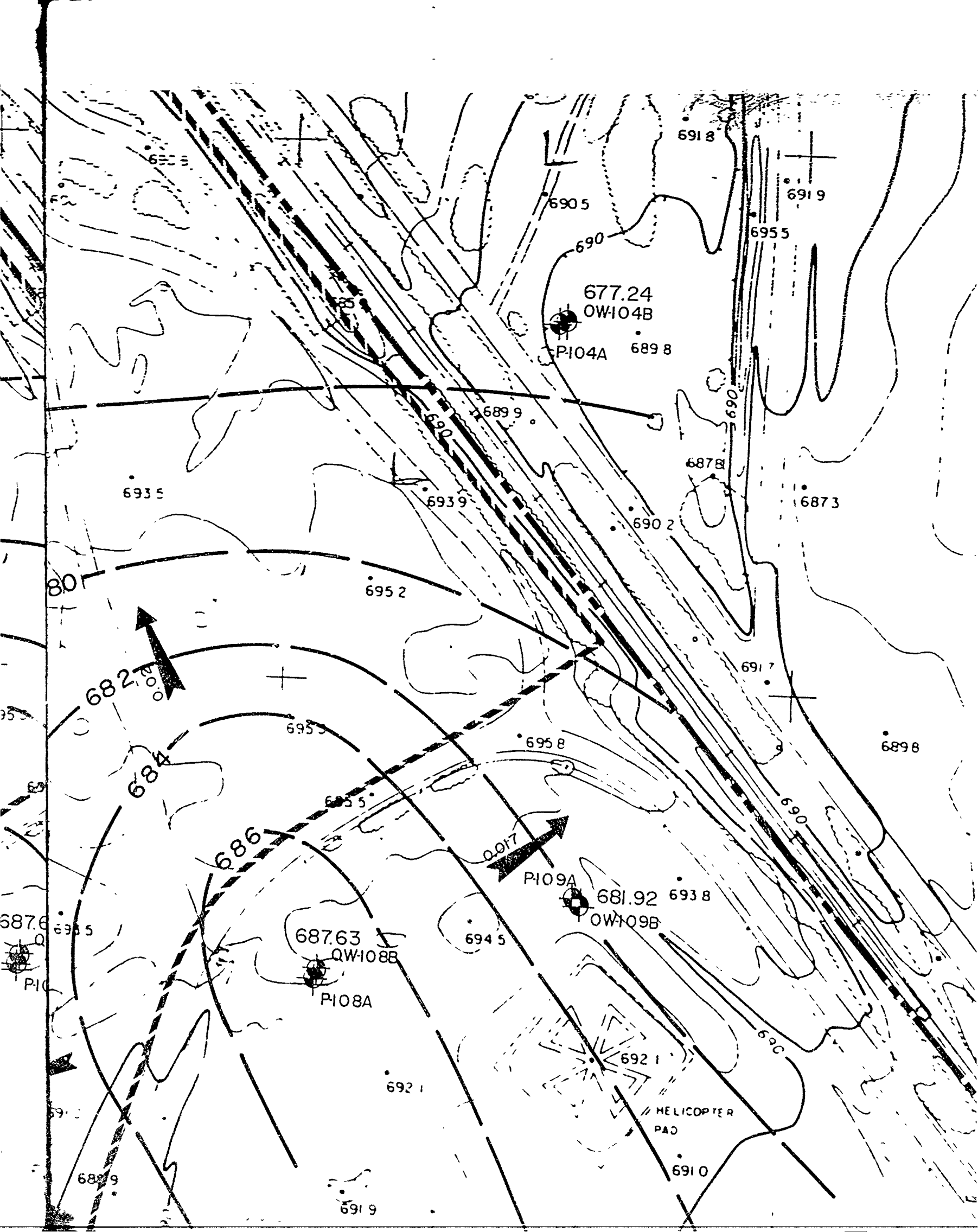
ENT  
CONT  
FLOW

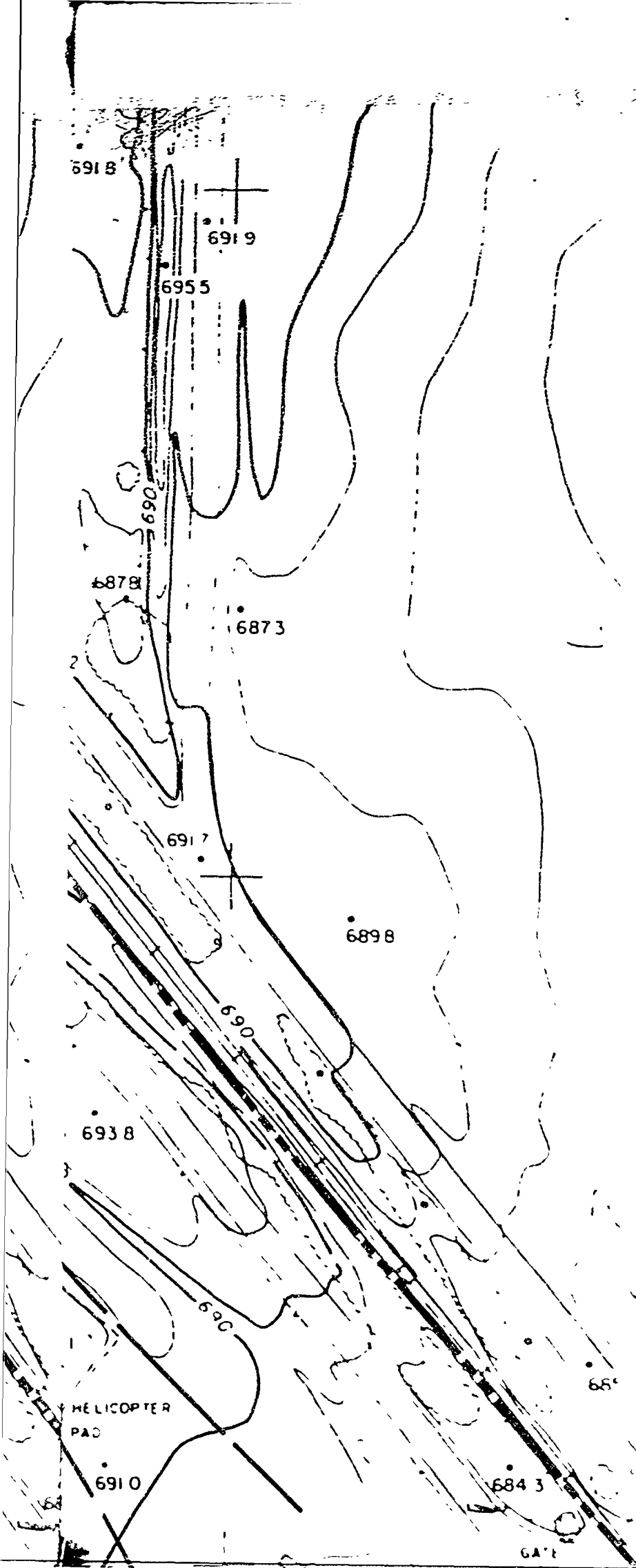
N





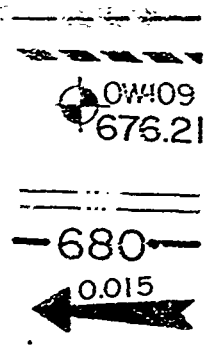






416,500 N

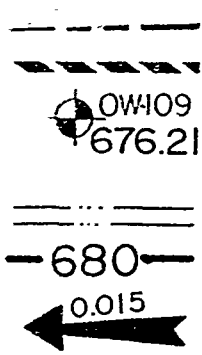
416,000 N



2  
3  
4  
5

SION	REV NO	DATE	

00 N

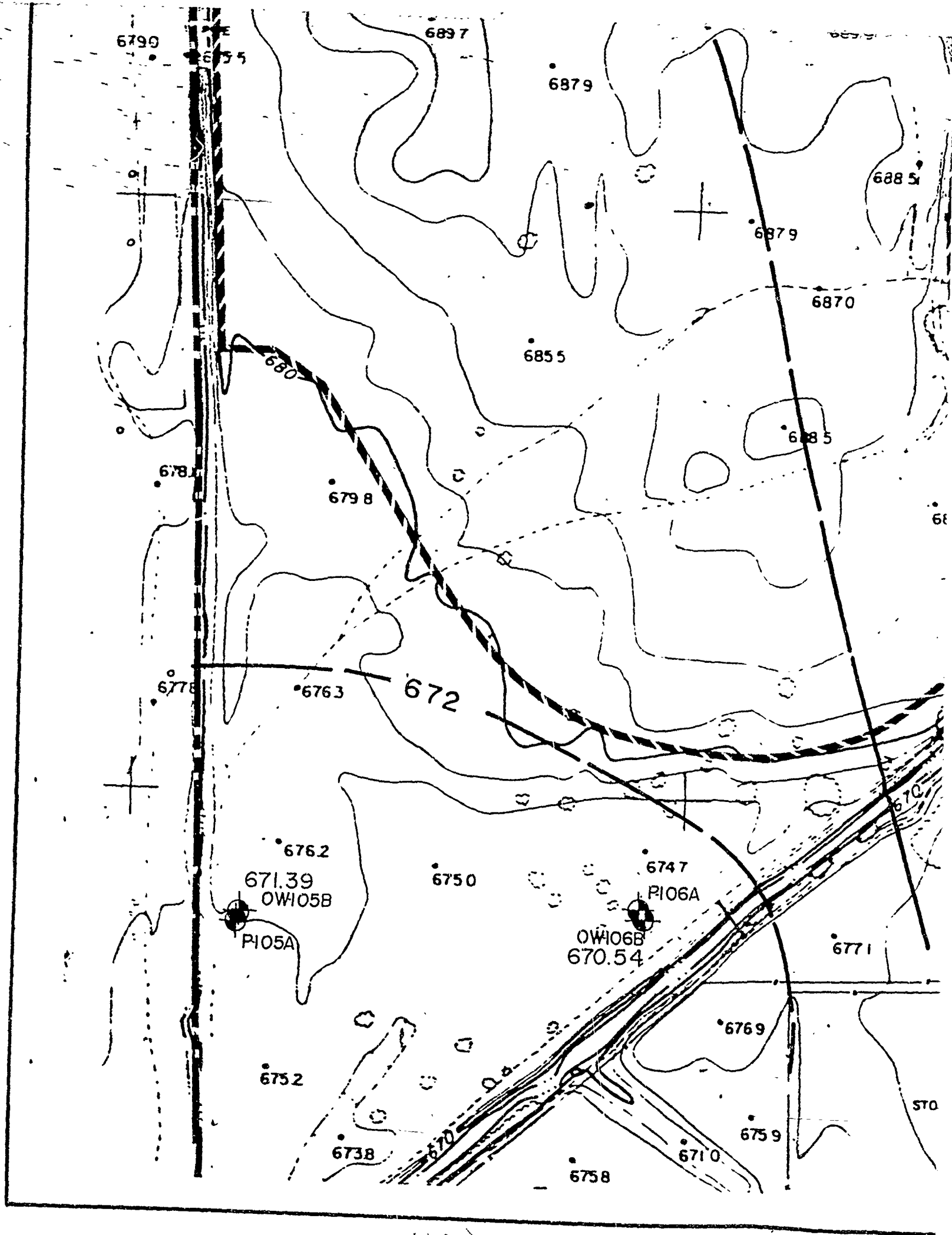


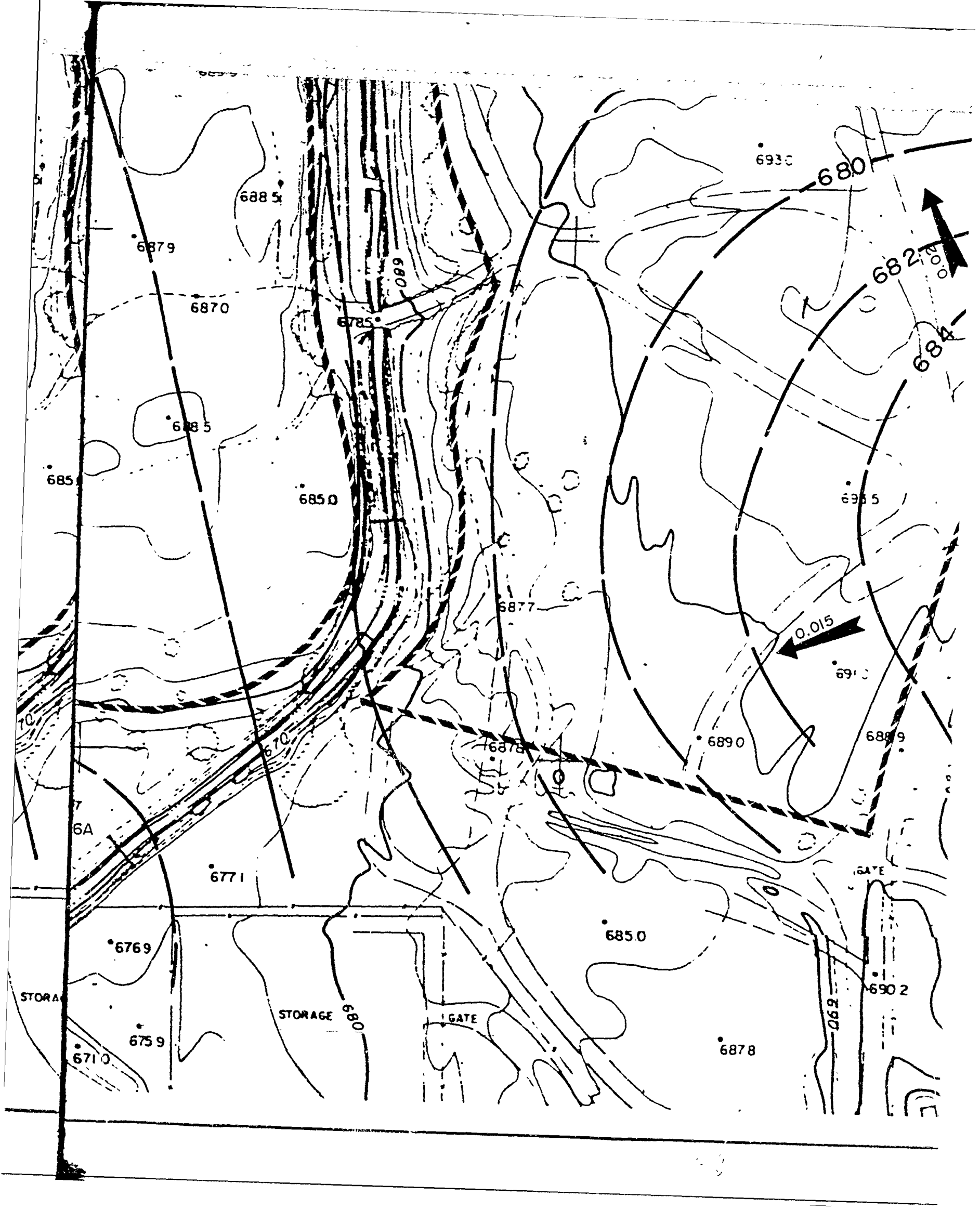
APPROXIMATE PROPERTY LINE  
APPROXIMATE LIMITS OF FILL  
EXISTING MONITORING WELL LOCATION  
AND MEASUREMENT  
CREEK  
GROUNDWATER CONTOUR  
GROUNDWATER FLOW DIRECTION  
AND GRADIENT

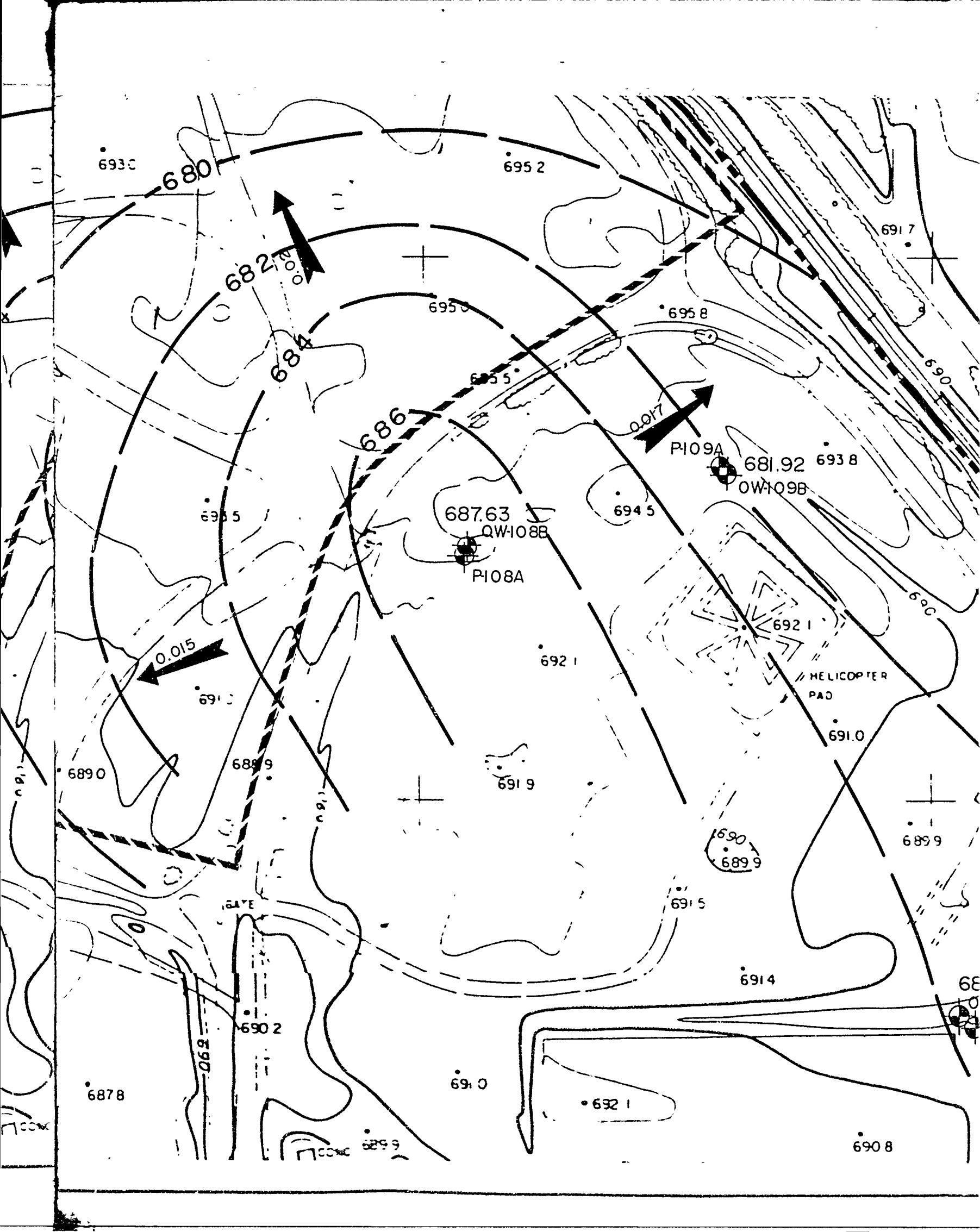
### NOTES

- 1 MAP REPRODUCED FROM TOPOGRAPHIC MAP  
HAVENWOODS FOREST PRESERVE, MILWAUKEE  
COUNTY, WISCONSIN SHEETS 1 AND 2  
PREPARED BY OWEN AYRES AND ASSOCIATES  
INC., MADISON, WISCONSIN
- 2 SITE LOCATION WITHIN SECTION 26, T8N-R2E
- 3 EXISTING CONTOUR INTERVAL IS TWO FEET.
- 4 WATER LEVEL MEASUREMENTS TAKEN FROM  
WATER TABLE WELLS (OW-WELLS) ON  
SEPTEMBER 28, 1987 BY FOTH & VAN DYKE.
- 5 GROUNDWATER CONTOUR INTERVAL IS TWO FEET.

00 N









00 N

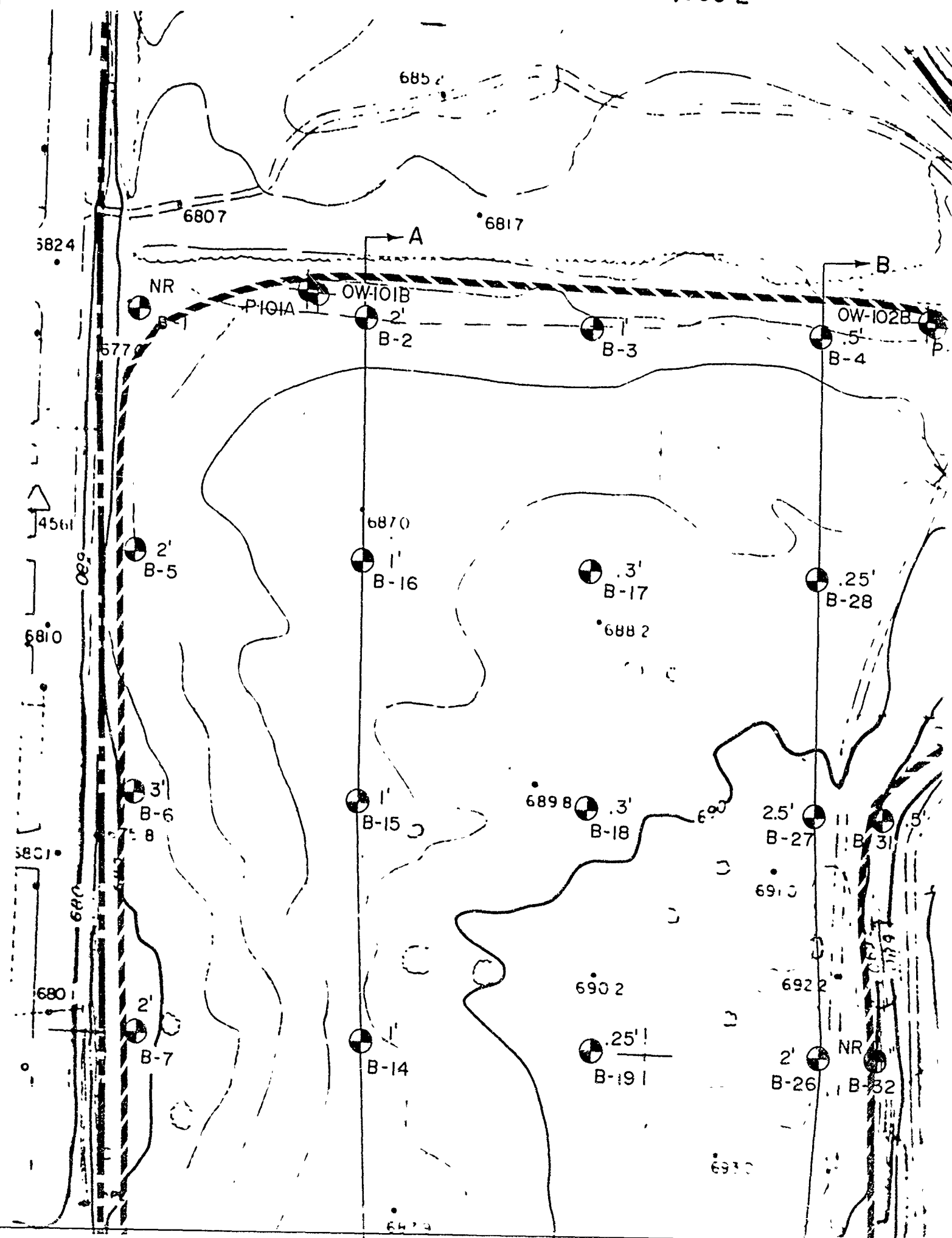
3. EXISTING CONTOUR INTERVAL IS TWO FEET.
4. WATER LEVEL MEASUREMENTS TAKEN FROM WATER TABLE WELLS (OW-WELLS) ON SEPTEMBER 28, 1987 BY FOTH & VAN DYKE.
5. GROUNDWATER CONTOUR INTERVAL IS TWO FEET.

DATE H 1000	REV NO DATE DESCRIPTION BY	PROJ NO HA00916-6P DATE NOV. 5 1987	O & M SAFETY FIRE CHIEF USER REP PAIO PREPARED BY DRAWN BY CHECKED BY	DIRECTORATE OF ENGINEERING AND HOUSING <b>FORT McCOY, WISCONSIN</b> LANDFILL SAMPLING AND ANALYSIS, USARC WEST SILVER SPRING DRIVE, MILWAUKEE, WI GROUNDWATER CONTOUR MAP CHIEF ENGINEERING SERVICES DIRECTOR OF ENGINEERING AND HOUSING	SCALE 1" = 100' DRAWING NO 47-018 1867 SHEET C-1 1 OF 2
----------------	-------------------------------------	--	--	--	--

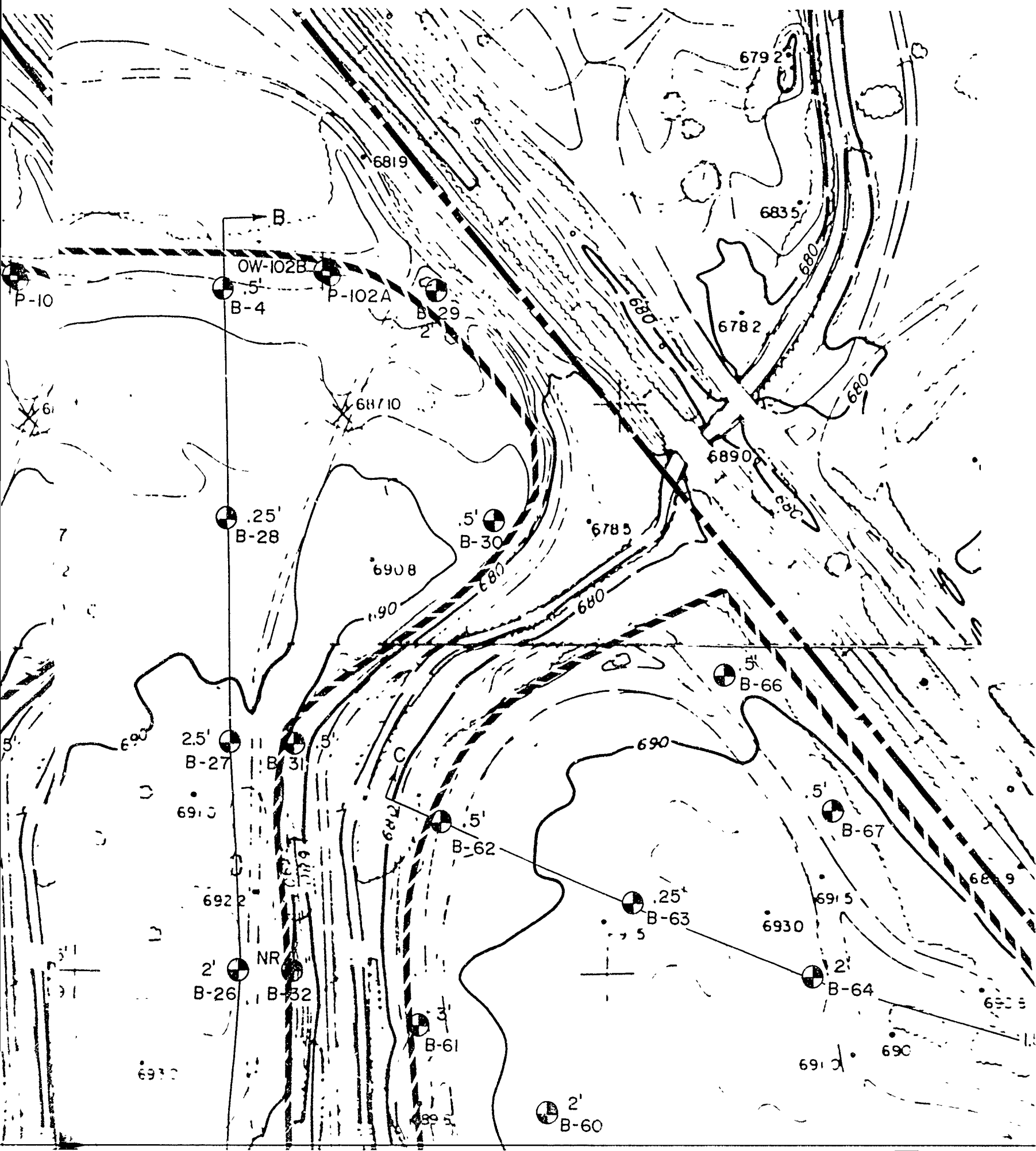
**FOTH & VAN DYKE**  
 GEOSCIENCES & ENVIRONMENTAL MANAGEMENT DIVISION  
 2737 S RIDGE ROAD  
 GREEN BAY, WISCONSIN 54307-5012  
 (414) 497-2500



2,539,500 E



2,540,000 E



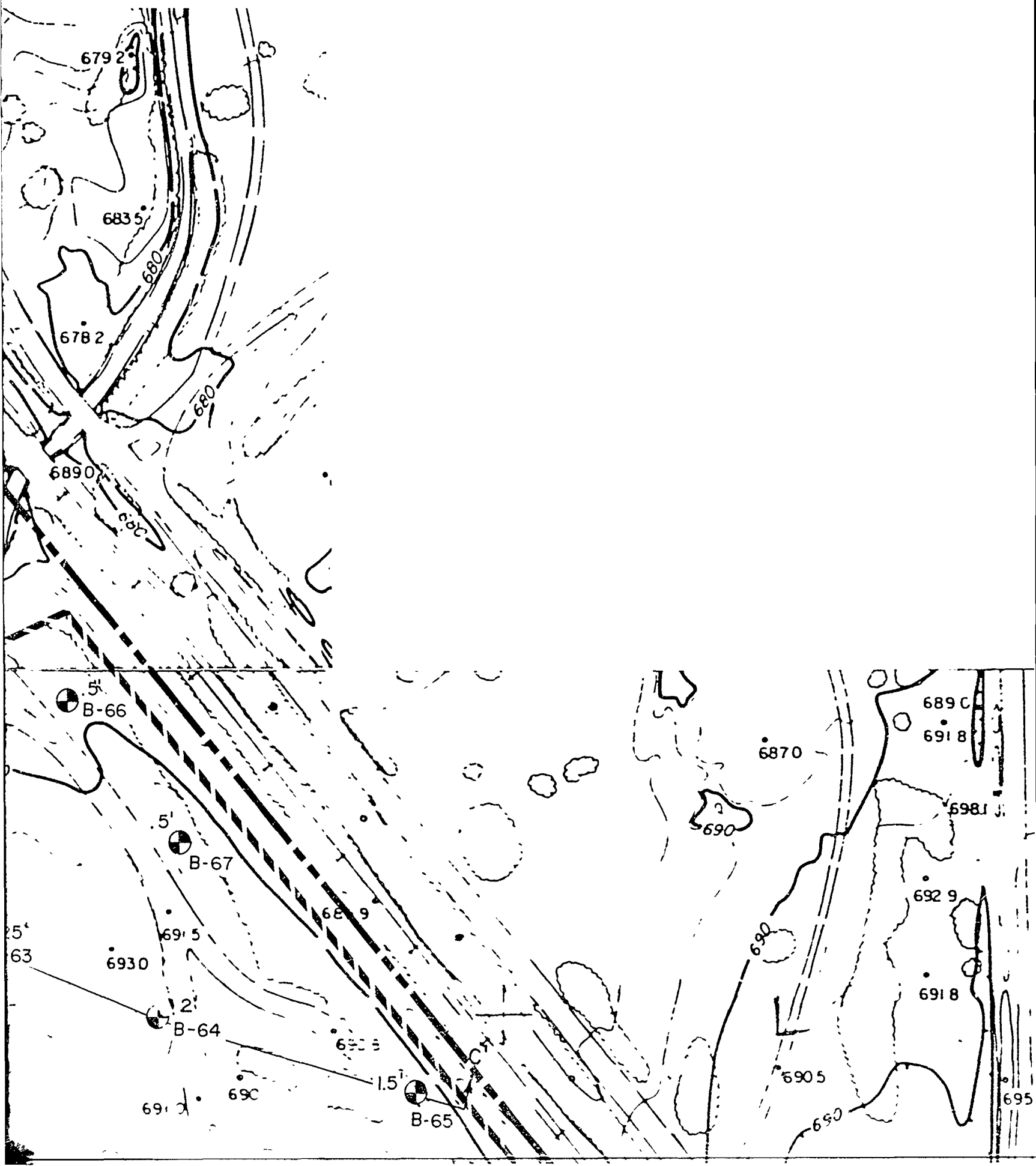
(B)

(C)

0 E

2,540,500 E

2,5

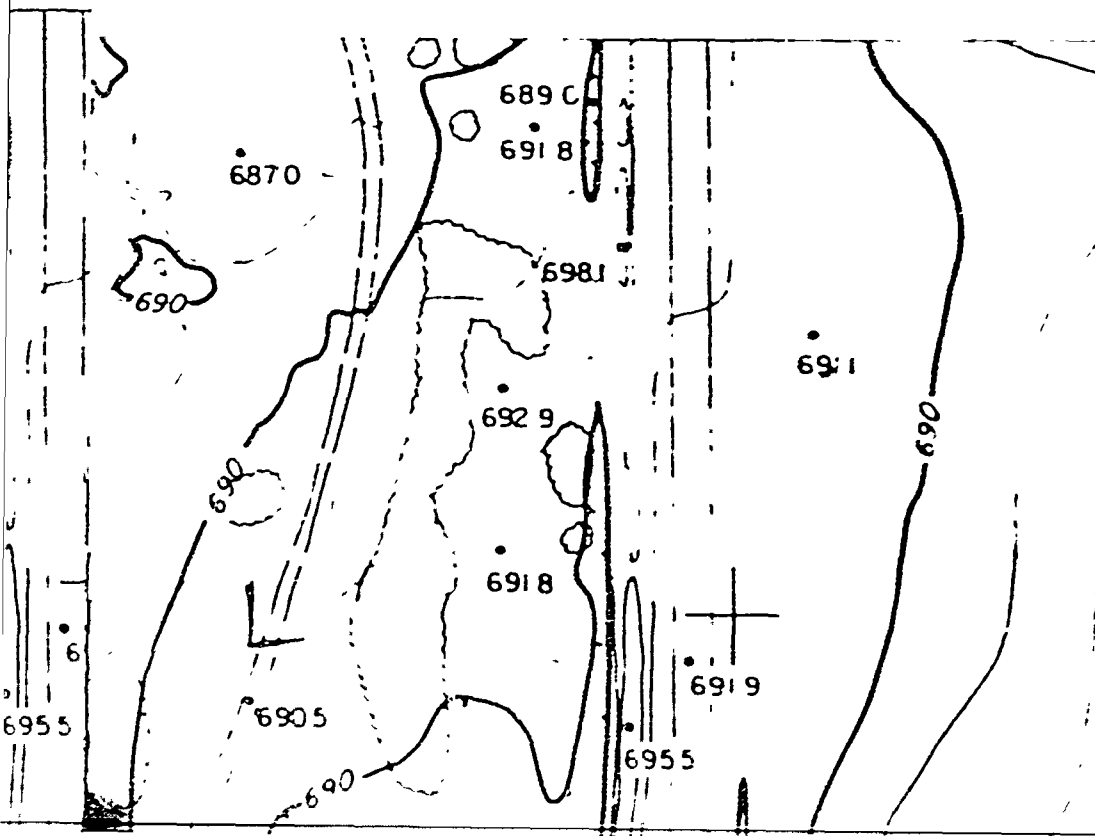


(1)

2,54

2,541,000 E

417,000 N



416,500 N

(D)

N

417,000 N

416,500 N

### LEGEND

— 690 —

EXISTING GROUND CONTOUR

• 691 8

EXISTING SPOT ELEVATION

— — — — —

TREES OR BRUSH

— — — — —

EXISTING UNIMPROVED ROADWAY

— — — — —

RAILROAD TRACKS

— — — — —

APPROXIMATE PROPERTY LINE

— — — — —

APPROXIMATE LIMITS OF FILL

OW109

EXISTING MONITORING WELL

B-47

BORING LOCATION AND NUMBER AND

— — — — —

CREEK

NR

NO REFUSE

(D)



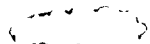
### LEGEND

— 690 —

EXISTING GROUND CONTOUR

• 691 8

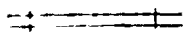
EXISTING SPOT ELEVATION



TREES OR BRUSH



EXISTING UNIMPROVED ROADWAY



RAILROAD TRACKS



APPROXIMATE PROPERTY LINE

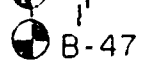


APPROXIMATE LIMITS OF FILL



OW109

EXISTING MONITORING WELL



BORING LOCATION AND NUMBER AND CAP THICKNESS

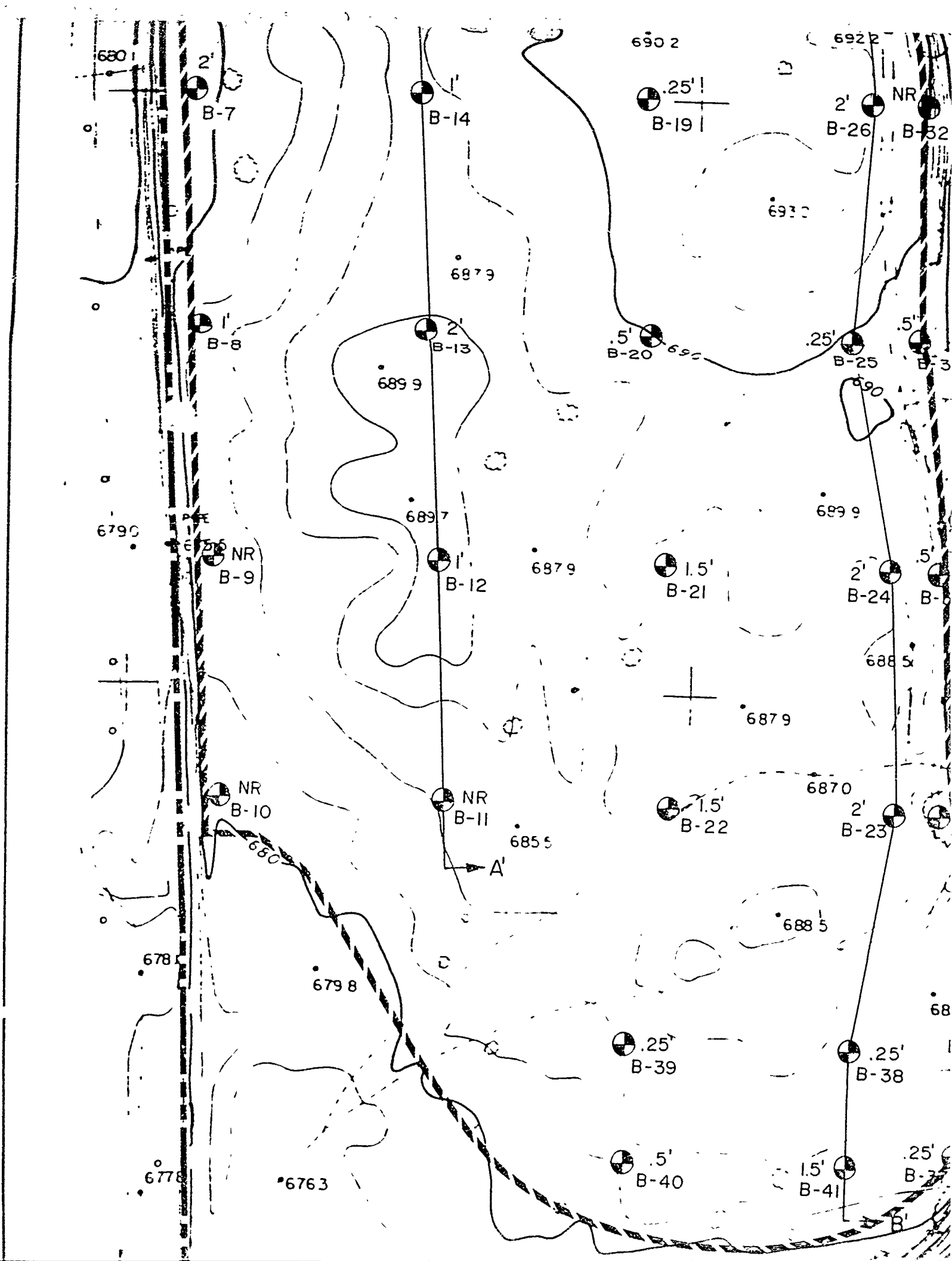


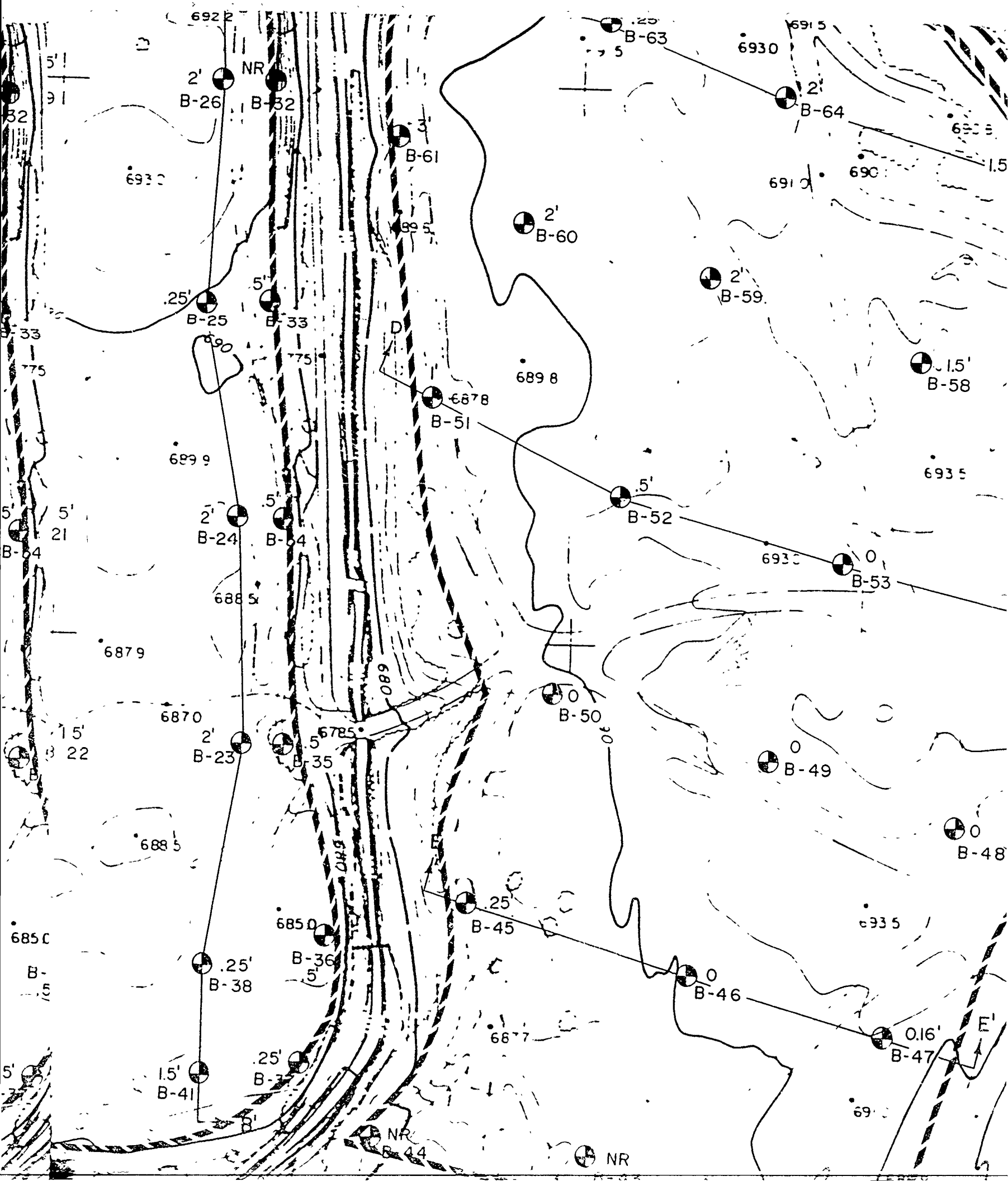
CREEK

NR

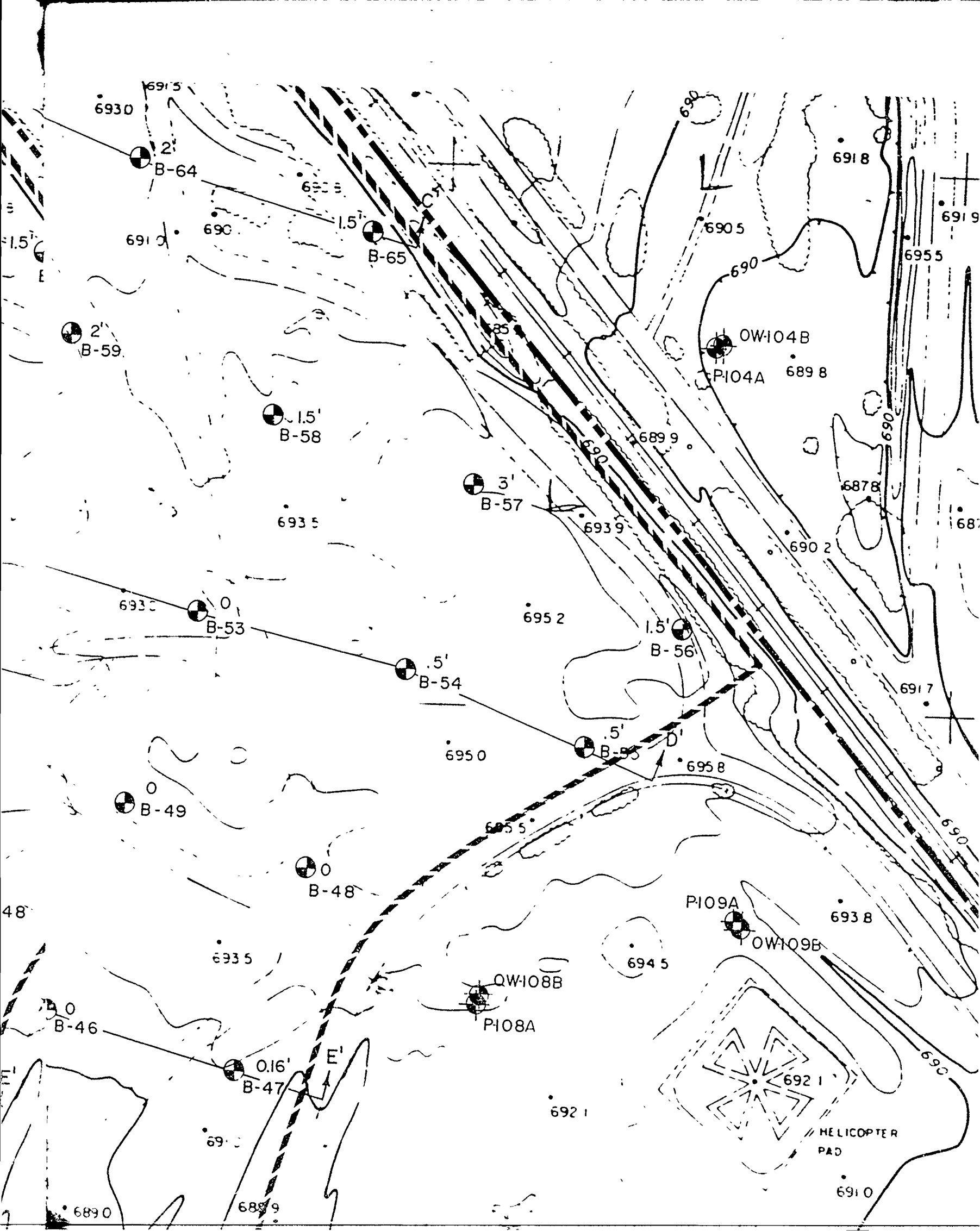
NO REFUSE

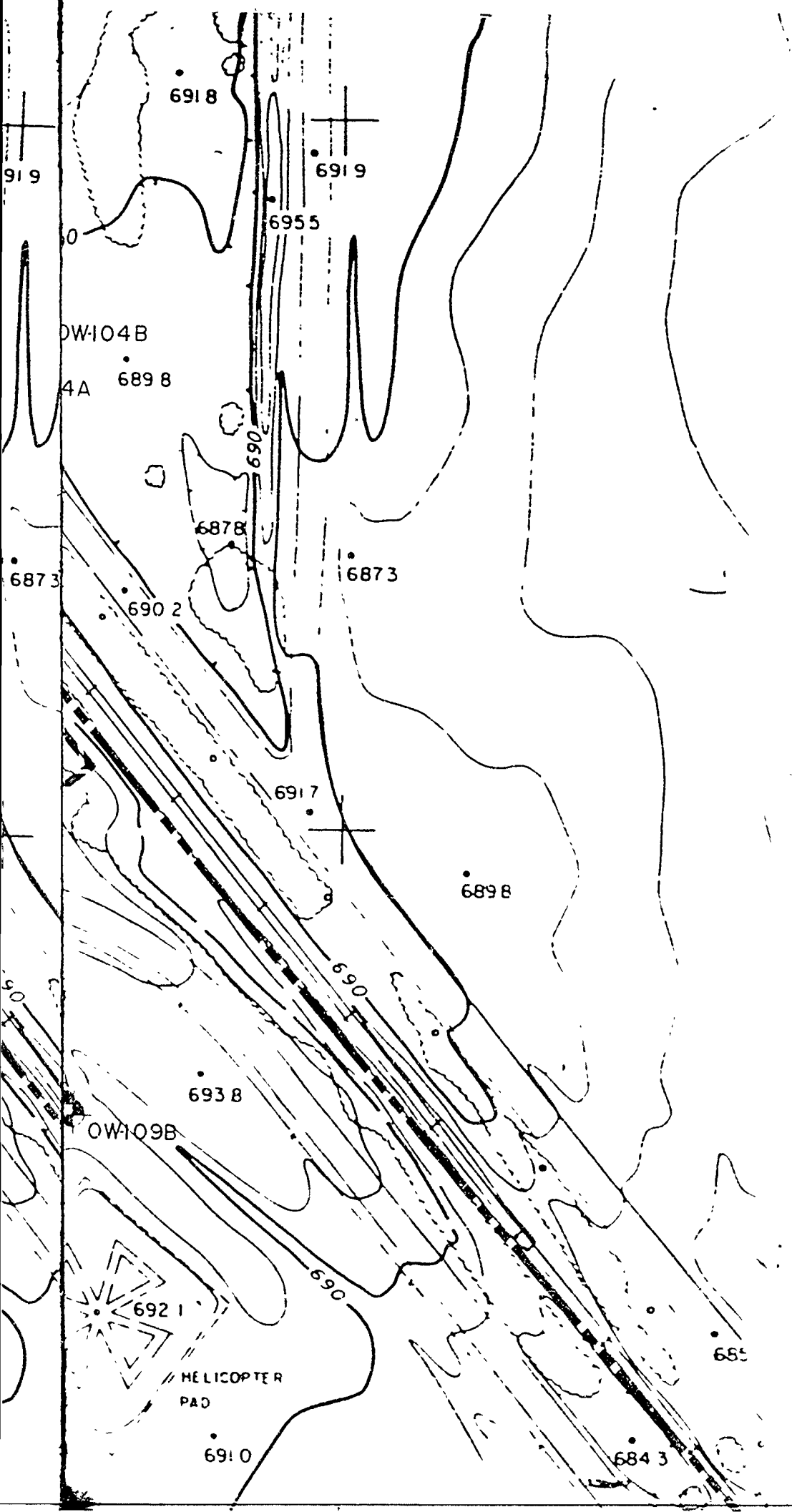
AN





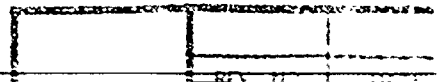


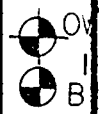




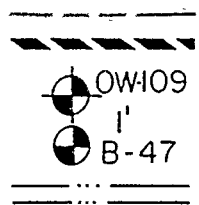
416,500 N

416,000 N





NR N



NR

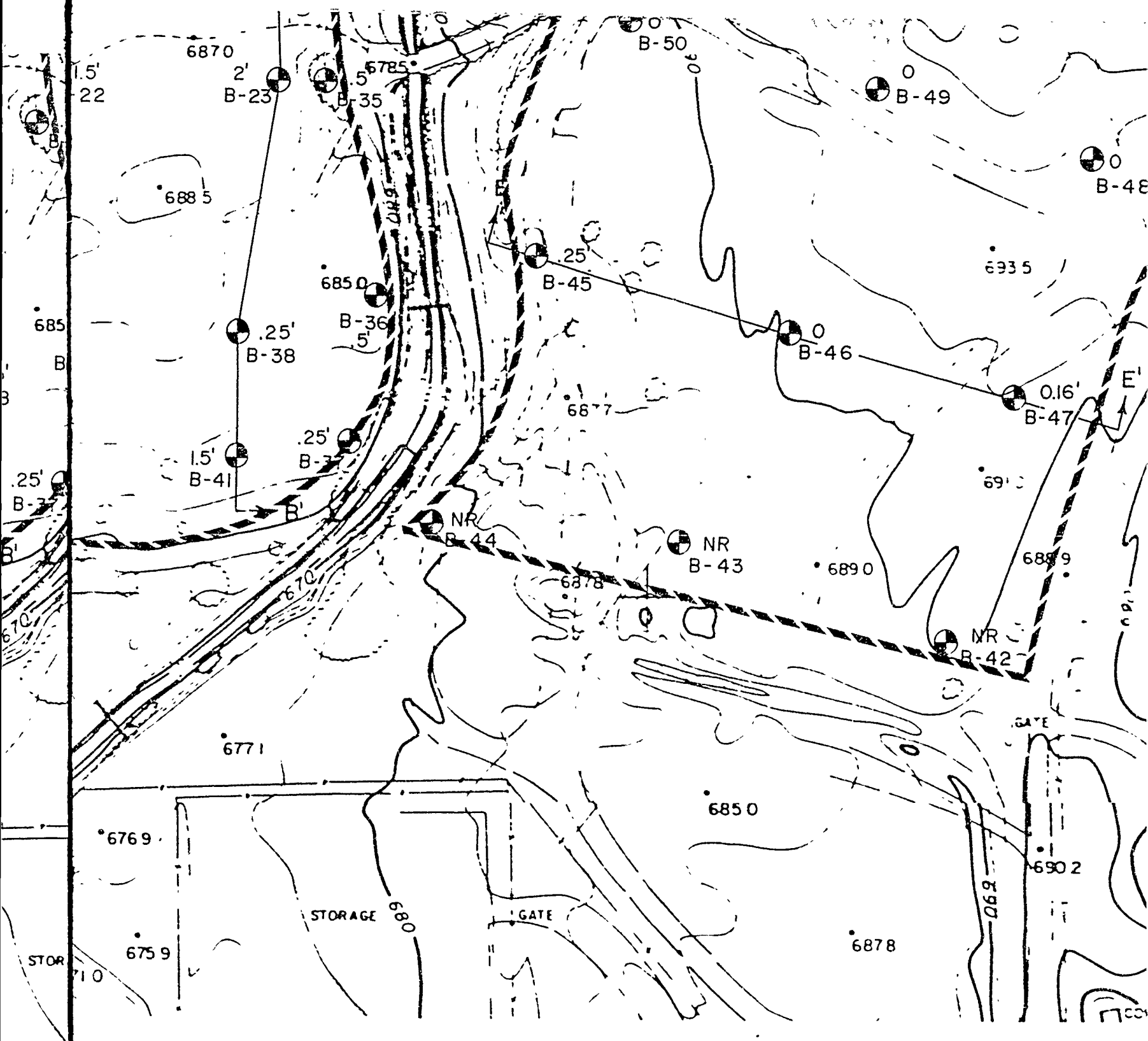
APPROXIMATE LIMITS OF FILL  
EXISTING MONITORING WELL  
BORING LOCATION AND NUMBER AND CAP THICKNESS  
CREEK  
NO REFUSE

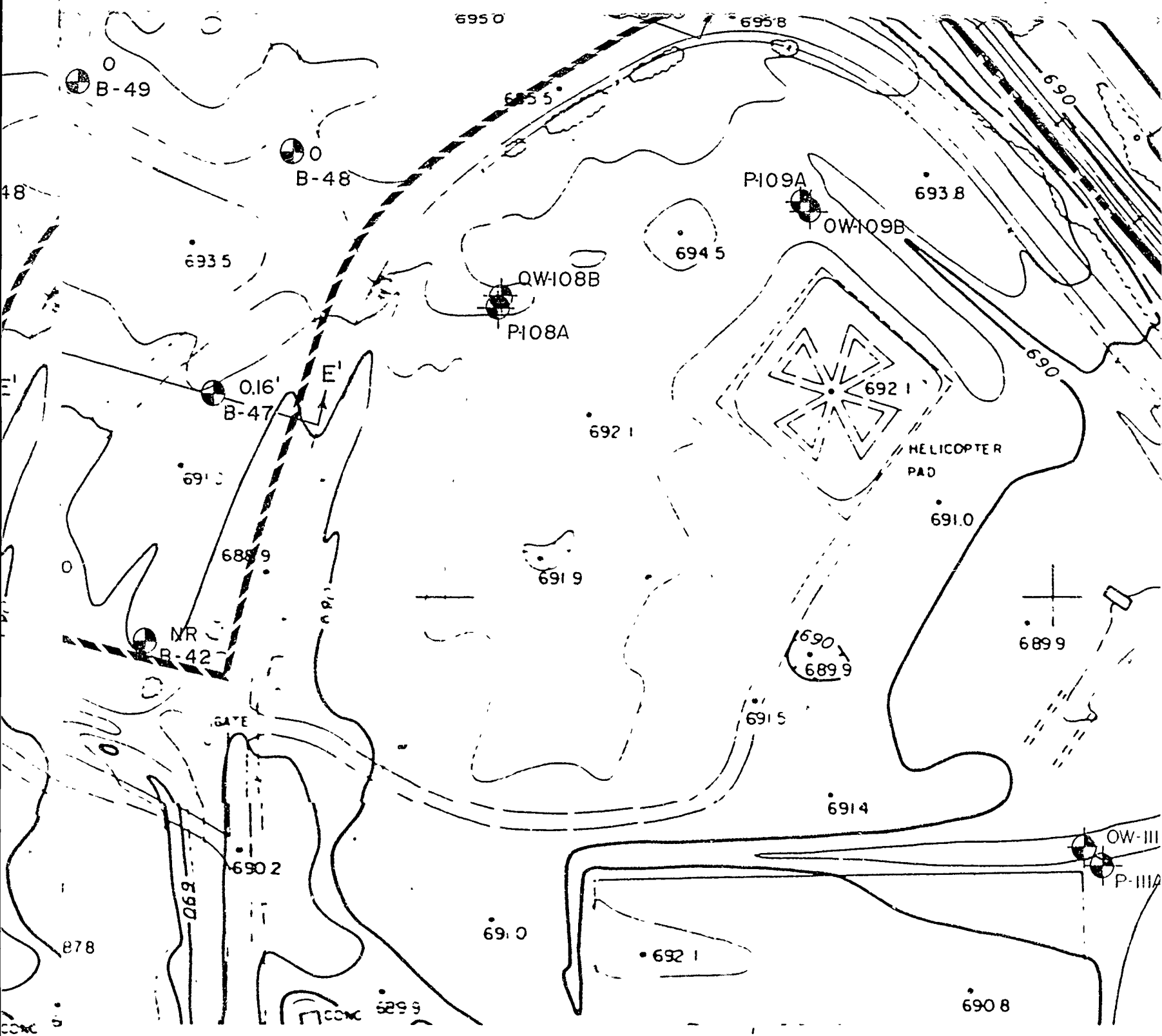
NOTES

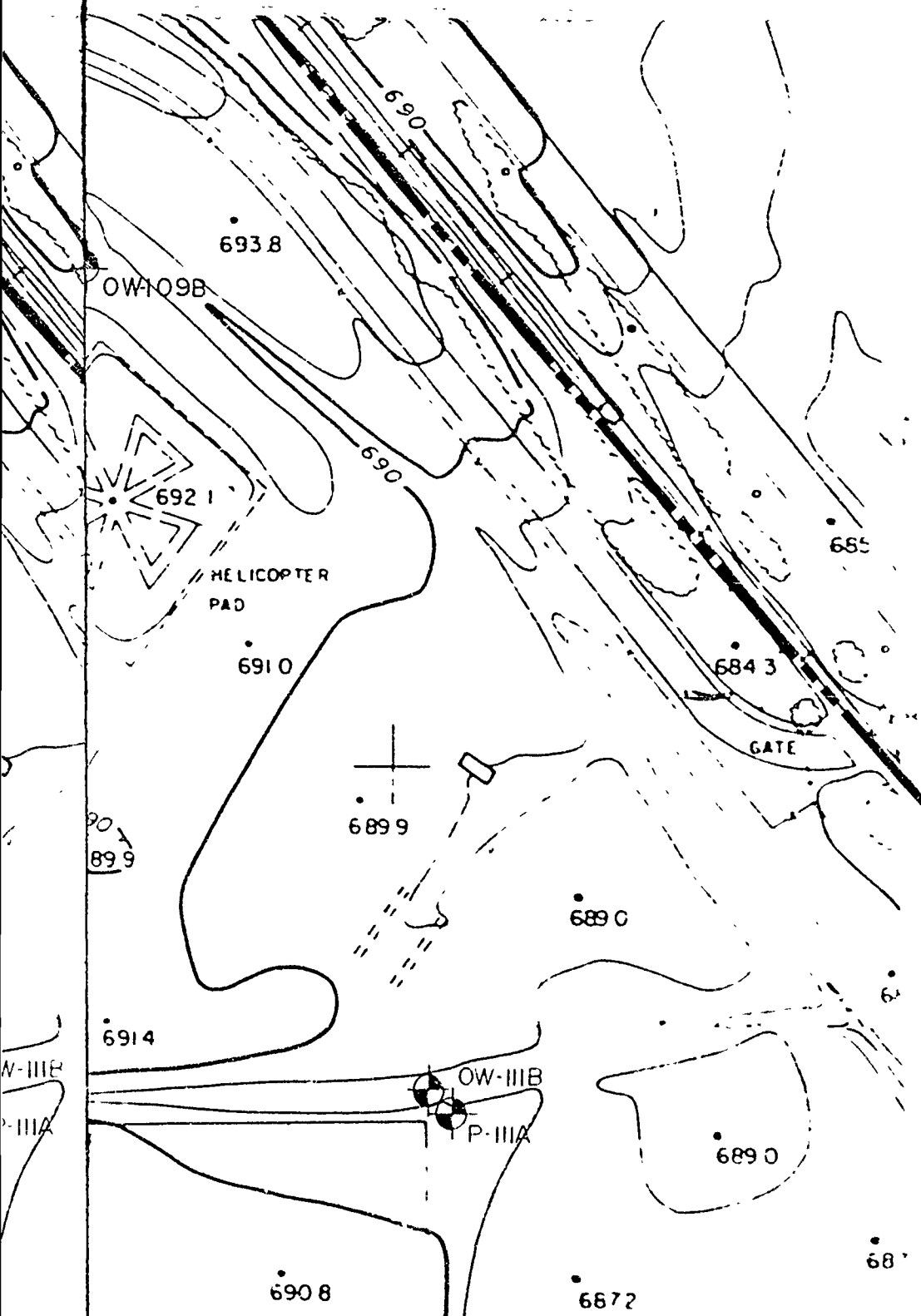
1. MAP REPRODUCED FROM TOPOGRAPHIC MAP  
HAVENWOODS FOREST PRESERVE, MILWAUKEE  
COUNTY, WISCONSIN. SHEETS 1 AND 2  
PREPARED BY OWEN AYRES AND ASSOCIATES,  
INC., MADISON, WISCONSIN.
2. SITE LOCATION WITHIN SECTION 26, T8N - R21E
3. CONTOUR INTERVAL IS TWO FEET.
4. SOIL BORINGS INSTALLED BY WISCONSIN  
TEST DRILLING, INC. SCHOFIELD, WISCONSIN -  
FEBRUARY 1987

N









415,500

**FOTH & VAN DYKE**  
 GEOSCIENCES & ENVIRONMENTAL MANAGEMENT DIVISION  
 2737 S RIDGE ROAD P.O. BOX 19012  
 GREEN BAY, WISCONSIN 54307-9012  
 (414) 497-2500

REV NO	DATE
PROJ NO	HA00
O & M	
SAFETY	
FIRE CHIEF	
USER REP	
PMO	
PREPARED BY	
DRAWN BY	
CHECKED BY	

(34)

ATE

A009 500

FOTH & VAN DYKE  
GEOSCIENCES & ENVIRONMENTAL MANAGEMENT DIVISION  
2737 S RIDGE ROAD P.O. BOX 19012  
GREEN BAY, WISCONSIN 54307-9012  
(414) 497-2500

REV NO

DATE

DESCRIPTION

BY

PROJ NO

HA00916-6P

DATE NOV 5, 1987

G &amp; M

SAFETY

FIRE CHIEF

USER REP

PMO

PREPARED BY

DRAWN BY

CHECKED BY

DIRECTORATE OF ENGINEERING AND HOUSING  
**FORT McCOY, WISCONSIN**

LANDFILL SAMPLING AND ANALYSIS, USARC  
WEST SILVER SPRING DRIVE, MILWAUKEE, WI

TOPOGRAPHIC AND BORING LOCATION MAP

CHIEF ENGINEERING SERVICES

DIRECTOR OF ENGINEERING AND HOUSING

SCALE

1" = 100'

DRAWING NO.

47-018-1867

SHEET. C-2

2 OF 2

(31)



APPENDIX B

Laboratory Results for Groundwater Analysis

APPENDIX B-1

Inorganic Parameters

FOTE AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS  
W.D.V.R. LAB CERT. NO. 405051240

Client Silver Spring Road  
Address

Sampled By MCH  
Scope I.D.  
Billing Line No.  
Liaison E. Possin  
Supply Order No.  
Result Sheet No. 35401.01

Name of Rep.  
Telephone No. (800) 803-0303

Sample I.D.	OX-101 B	P-101 A	OX-102 B	P-102 A	OX-104 B
Date Collected	1/27/87	1/27/87	1/27/87	1/27/87	1/27/87
Date Received	1/28/87	1/29/87	1/29/87	1/29/87	1/29/87
Parameters, units	Results				
C.O.D., mg/l	13	29	23	49	9
B.O.D., mg/l	< 6	< 6	7	< 6	< 6
Dis. Iron, mg/l	< 0.10	3.4	< 0.10	< 0.10	< 0.10
Hardness, mg/l	660	620	540	460	380
Alkalinity, mg/l	520	410	470	340	340
NO2+NO3-N, mg/l	0.06	< 0.05	< 0.05	0.19	< 0.05
NH3-N, mg/l	0.35	0.42	1.0	0.57	0.10
Barium, mg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloride, mg/l	90	130	54	75	11
Sulfates, mg/l	240	260	210	230	120
Chromium, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Mercury, mg/l	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Lead, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Cadmium, mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Arsenic, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Comments:					

Signed:

*Emil J. Long*

Date:

3/4/87

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS  
W.D.N.R. LAB CERT. NO. 405051240

Client Address Silver Spring Road

Sampled By MJH  
Scope I.D.  
Billing Line No.  
Liaison B. Possin  
Supply Order No.  
Result Sheet No. 35491.06

Name of Rep.  
Telephone No. (000) 000-0000

Sample I.D.	OW-101 B	P-101 A	OW-102 <sup>6</sup> A	P-102 A	OW-104 B
-------------	----------	---------	-----------------------	---------	----------

Date Collected	1/27/87	1/27/87	1/27/87	1/27/87	1/27/87
----------------	---------	---------	---------	---------	---------

Date Received	1/29/87	1/29/87	1/29/87	1/29/87	1/29/87
---------------	---------	---------	---------	---------	---------

Parameters, units	Results				
-------------------	---------	--	--	--	--

Boron, mg/l	0.23	0.16	0.28	< 0.02	< 0.02
-------------	------	------	------	--------	--------

comments:

Signed: Paul J. Day

Date: 1/4/87

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS

W.D.M.R. LAB CERT. NO. 405051240

Client	Silver Spring Road	Sampled By	HJH
Address		Scope I.D.	
		Billing Line No.	
		Liaison	B. Possin
Name of Rep.		Supply Order No.	
Telephone No.	(000) 000-0000	Result Sheet No.	35491.02

Sample I.D.	OW-106 B	P-105 A	OW-108 B	P-108 A	OW-109 B
Date Collected	1/23/87	1/27/87	1/27/87	1/27/87	1/27/87
Date Received	1/29/87	1/29/87	1/29/87	1/29/87	1/29/87
Parameters, units	Results				
C.O.D, mg/l	21	18	12	11	< 5
B.C.D., mg/l	< 6	< 6	< 6	< 6	< 6
Dis. Iron, mg/l	< 0.10	2.9	< 0.10	0.15	< 0.10
Hardness, mg/l	480	730	920	960	400
Alkalinity, mg/l	380	420	590	640	350
NO <sub>2</sub> +NO <sub>3</sub> -N, mg/l	< 0.05	< 0.05	0.30	< 0.05	< 0.05
NH <sub>3</sub> -N, mg/l	0.15	0.27	0.15	0.17	< 0.10
Barium, mg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloride, mg/l	30	150	17	27	6
Sulfates, mg/l	160	300	350	490	85
Chromium, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Mercury, mg/l	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Lead, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Cadmium, mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Arsenic, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Comments:					

Signed: Sam J. Long

Date: 3/4/87

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-2012

LABORATORY ANALYSIS RESULTS  
W.D.N.R. LAB CERT. NO. 405051240

Client Address Silver Spring Road

Sampled By MJH  
Scope I.D.  
Billing Line No.  
Liaison B. Possin  
Supply Order No.  
Result Sheet No. 35491.05

Name of Rep.  
Telephone No. (000) 000-0000

Sample I.D.	OW-106 3	P-105 A	OW-108 A	P-108 A	OW-109 3
Date Collected	1/28/87	1/27/87	1/27/87	1/27/87	1/27/87
Date Received	1/29/87	1/29/87	1/29/87	1/29/87	1/29/87

Parameters, units

Results

Boron, mg/l	0.10	0.36	0.49	0.28	0.23
-------------	------	------	------	------	------

comments:

Signed: Emilio J. Sney

Date: 3/4/87

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS  
W.D.M.R. LAB CERT. NO. 405051240

Client Address Silver Spring Road

Sampled By MJH  
Scope I.D.  
Billing Line No.  
Liaison B. Possin  
Supply Order No.  
Result Sheet No. 35491.03

Name of Rep.  
Telephone No. (000) 000-0000

Sample I.D.	OW-111 B	P-109 A	Upstream	Downstream	Field Blank
Date Collected	1/27/87	1/27/87	1/28/87	1/28/87	1/27/87
Date Received	1/29/87	1/29/87	1/29/87	1/29/87	1/29/87
Parameters, units	Results				
C.O.D, mg/l	29	< 5	14	9	< 5
B.O.D., mg/l	< 5	< 6	< 6	< 6	< 6
Dis. Iron, mg/l	< 0.10	< 0.10	0.13	0.32	< 0.10
Hardness, mg/l	730	600	250	250	< 2
Alkalinity, mg/l	510	290	170	200	< 10
NO <sub>2</sub> +NO <sub>3</sub> -N, mg/l	< 0.05	< 0.05	0.23	0.17	< 0.05
NH <sub>3</sub> -N, mg/l	< 0.10	< 0.10	0.13	0.13	< 0.10
Barium, mg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloride, mg/l	7	45	240	230	3
Sulfates, mg/l	250	300	44	56	< 5
Chromium, mg/l	< 0.005	< 0.005	0.005	0.005	< 0.005
Mercury, mg/l	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Lead, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Cadmium, mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Arsenic, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Comments:					

Signed:

*Smith J. Long*

Date:

*3/4/87*

FOTE AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS

W.D.N.R. LAB CERT. NO. 405051240

Client Address Silver Spring Road

Sampled By MJH

Scope I.D.

Billing Line No.

Liaison B. Possin

Name of Rep.

Supply Order No.

Telephone No. (000) 000-0000

Result Sheet No. 35491.04

Sample I.D.	CW-111 B	P-109 A	Upstream	Downstream	Field Blank
Date Collected	1/27/87	1/27/87	1/28/87	1/28/87	1/27/87
Date Received	1/29/87	1/29/87	1/29/87	1/29/87	1/29/87

Parameters, units

Results

Boron, mg/l	0.10	0.12	< 0.02	0.03	< 0.02
-------------	------	------	--------	------	--------

comments:

Signed:

*Frank J. May*

Date:

3/4/87



# GROUNDWATER WELL MONITORING DATA

PERSONNEL: MJH

SCOPE I.D.: 86M94

SITE: Silver Spring L.F.

TEMP: 25°

WEATHER: Cloudy Lt. Snow

pH/Cond. Meter Serial No.

DATE	TIME	WELL #	DEPTH TO GW	TOP OF PVC TOTAL DEPTH	AMOUNT PURGED	DEPTH TO GW AFTER PURGE	TEMP	CONDUCT @ 25°C	PH	COLOR	ODOR	TURB
1-27	11:15	OW-101B	11.31	21.54	5	12.00	6.48	1410	8°C	DK. BR.	SLIGHT	V. HIGH
1-27	11:45	P-101A	10.81	49.00	20	12.00	6.67	1362	8°C	V. LT. BR.	SLIGHT	SLIGHT
1-27	10:00	OW-102B	10.00	21.42	6	11.00	6.79	1305	8°C	DK. BR.	NO	V. HIGH
1-27	10:30	P-102A	10.04	47.58	5.5	DRY	7.00	1156	8°C	LT. BR.	NO	MOD.
1-27	9:00	OW-104B	11.31	23.33	2	DRY	6.70	848	8°C	LT. BR.	NO	HIGH
1-27	1:00	P-105A	5.69	46.08	20	5.75	6.75	1536	9°C	LT. BR.	NO.	MOD.
1-28	9:30	OW-106B	7.19	21.00	3	DRY	6.80	982	8°C	LT. BR.	SLIGHT	V. HIGH
1-27	3:30	OW-108B	10.33	23.50	2	DRY	6.56	1746	8°C	DK. BR.	NO	V. HIGH
1-27	4:00	P-108A	16.17	46.50	15	16.20	6.31	1848	8°C	LT. BR.	NO	MOD.
1-27	4:30	P-109B	15.00	22.54	4	DRY	6.52	794	8°C	LT. BR.	NO	MOD.
1-27	5:00	P-109A	15.29	39.25	4	DRY	6.93	1104	8°C	V. LT. BR.	NO	SLIGHT
1-27	2:00	OW-111B	9.67	22.54	2	DRY	6.49	1408	8°C	LT. BR.	NO	MOD.
1-28	8:30	UPSTREAM	--	--	--	--	6.91	975	4°C	CLEAR	NO	NO
1-28	9:00	DOWNSTREAM	--	--	--	--	7.13	981	4°C	CLOUDY	NO	V. SLIGHT

COMMENTS:	WELL NO.	D.T.W.	I.D.
	OW-105B	6.44	23.08
	P-111A	13.17	40.83
	P-106A	6.96	46.67

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS  
W.D.N.R. LAB CERT. NO. 405051240

Client Silver Spring Road Sampled By MJH  
Address Scope I.D.  
Billing Line No.  
Liaison J. Kesy  
Name of Rep. Supply Order No.  
Telephone No. (000) 000-0000 Result Sheet No. 35777.01

Sample I.D.	Upstream	Downstream	Seepage Point	OW-101 B	P-101 A
Date Collected	3/25/87	3/25/87	3/25/87	3/25/87	3/25/87
Date Received	3/26/87	3/26/87	3/26/87	3/26/87	3/26/87
Parameters, units	Results				
C.O.D., mg/l	26	26	26	24	23
B.O.D., mg/l	< 6	< 6	< 6	< 6	< 6
Dis. Iron, mg/l	0.31	0.44	5.7	0.16	3.4
Hardness, mg/l	300	370	790	710	680
Alkalinity, mg/l	210	250	660	540	420
NO2+NO3-N, mg/l	0.64	0.92	0.44	< 0.05	< 0.05
NH3-N, mg/l	0.1	0.4	0.1	0.1	0.1
Barium, mg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloride, mg/l	170	170	55	65	84
Sulfates, mg/l	62	80	250	260	260
Chromium, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Mercury, mg/l	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Lead, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Cadmium, mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Arsenic, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
comments:					

Signed:

*James J. Kesy*

Date:

4/27/87

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS  
W.D.M.R. LAB CERT. NO. 405051240

Client	Silver Spring Road	Sampled By	HJH
Address		Scope I.D.	
		Billing Line No.	
		Liaison	J. Kesy
Name of Rep.		Supply Order No.	
Telephone No.	(000) 000-0000	Result Sheet No.	35777.02

Sample I.D.	OW-102 B	P-102 A	OW-104 B	P-105 A	OW-106 B
Date Collected	3/25/87	3/25/87	3/25/87	3/25/87	3/25/87
Date Received	3/26/87	3/26/87	3/26/87	3/26/87	3/26/87
Parameters, units	Results				
C.O.D., mg/l	34	< 5	21	16	< 5
B.O.D., mg/l	< 6	7	< 6	< 6	< 6
Dis. Iron, mg/l	< 0.10	< 0.10	< 0.10	2.8	< 0.10
Hardness, mg/l	370	600	540	760	560
Alkalinity, mg/l	500	430	340	430	390
NO <sub>2</sub> +NO <sub>3</sub> -N, mg/l	0.08	0.25	< 0.05	< 0.05	< 0.05
NH <sub>3</sub> -N, mg/l	0.1	0.1	0.2	0.3	< 0.1
Barium, mg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloride, mg/l	24	38	14	100	20
Sulfates, mg/l	240	220	170	300	180
Chromium, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Mercury, mg/l	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Lead, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Cadmium, mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Arsenic, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Comments:					

Signed:

*Donald J. Kesy*

Date:

*4/27/87*

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS

W.D.N.R. LAB CERT. NO. 405051240

Client Silver Spring Road  
Address

Sampled By MJH  
Scope I.D.  
Billing Line No.  
Liaison J. Kesy  
Supply Order No.  
Result Sheet No. 35777.03

Name of Rep.  
Telephone No. (000) 000-0000

Sample I.D.	OW-103 B	P-108 A	OW-109 B	P-109 A	OW-111 B
Date Collected	3/25/87	3/25/87	3/25/87	3/25/87	3/25/87
Date Received	3/26/87	3/26/87	3/26/87	3/26/87	3/26/87

Parameters, units

Results

C.O.D., mg/l	< 5	< 5	14	< 5	8
B.O.D., mg/l	< 6	< 6	< 6	< 6	< 6
Dis. Iron, mg/l	< 0.10	0.21	< 0.10	< 0.10	< 0.10
Hardness, mg/l	1110	1160	440	620	850
Alkalinity, mg/l	710	670	370	290	610
NO <sub>2</sub> +NO <sub>3</sub> -N, mg/l	0.37	0.20	< 0.05	< 0.05	0.58
NH <sub>3</sub> -N, mg/l	0.4	0.2	0.1	0.2	0.3
Barium, mg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloride, mg/l	24	22	4	44	6
Sulfates, mg/l	480	560	100	290	284
Chromium, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Mercury, mg/l	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Lead, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Cadmium, mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Arsenic, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005

comments:

Signed:

*Ernest G. Berg*

Date:

4/27/87

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS

W.D.N.R. LAB CERT. NO. 405051240

Client Address Silver Spring Road

Sampled By MJH  
Scope I.D.  
Billing Line No.  
Liaison J. Kesy

Name of Rep.  
Telephone No. (000) 000-0000

Supply Order No.  
Result Sheet No. 35777.04

Sample I.D. Field  
Blank  
Date Collected 3/25/87  
Date Received 3/26/87

Parameters, units

Results

C.O.D., mg/l	< 5
B.O.D., mg/l	< 6
Dis. Iron, mg/l	< 0.10
Hardness, mg/l	< 2
Alkalinity, mg/l	< 10
NO <sub>2</sub> +NO <sub>3</sub> -N, mg/l	0.03
NH <sub>3</sub> -N, mg/l	0.2
Barium, mg/l	< 1.0
Chloride, mg/l	7
Sulfates, mg/l	< 5
Chromium, mg/l	< 0.005
Mercury, mg/l	< 0.0005
Lead, mg/l	< 0.005
Cadmium, mg/l	< 0.001
Arsenic, mg/l	< 0.005

comments:

Signed:

*Scott J. Berg*

Date:

4/27/87

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS  
W.D.N.R. LAB CERT. NO. 405051240

Client Address Silver Spring Road

Sampled By IJH  
Scope I.D.  
Billing Line No.  
Liaison J. Kesy

Name of Rep.  
Telephone No. (000) 000-0000

Supply Order No.  
Result Sheet No. 35777.05

Sample I.D.	OW-108 B	P-108 A	OW-109 B	P-109 A	OW-111 B
Date Collected	3/25/87	3/25/87	3/25/87	3/25/87	3/25/87
Date Received	3/26/87	3/26/87	3/26/87	3/26/87	3/26/87

Parameters, units

Results

Boron, mg/l	0.60	0.15	0.10	0.05	0.12
-------------	------	------	------	------	------

comments:

Signed:

*Samuel J. Kesy*

Date:

*4/27/87*

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS  
W.D.M.P. LAB CERT. NO. 405051240

Client Address Silver Spring Road

Sampled By HJE  
Scope I.D.  
Billing Line No.  
Liaison J. Kesy  
Supply Order No.  
Result Sheet No. 35777.06

Name of Rep.  
Telephone No. (000) 000-0000

Sample I.D.	OH-102 B	P-102 A	OH-104 B	P-105 A	OH-106 B
-------------	----------	---------	----------	---------	----------

Date Collected	3/25/87	3/25/87	3/25/87	3/25/87	3/25/87
----------------	---------	---------	---------	---------	---------

Date Received	3/26/87	3/26/87	3/26/87	3/26/87	3/26/87
---------------	---------	---------	---------	---------	---------

Parameters, units	Results				
-------------------	---------	--	--	--	--

Boron, mg/l	0.44	0.33	0.06	0.25	0.07
-------------	------	------	------	------	------

Comments:

Signed:

*Samuel G. Day*

Date:

*4/27/87*

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS  
W.D.M.R. LAB CERT. NO. 405051240

Client	Silver Spring Road	Sampled By	WJH
Address		Scope I.D.	
		Billing Line No.	
		Liaison	J. Kesy
Name of Rep.		Supply Order No.	
Telephone No.	(000) 000-0000	Result Sheet No.	35777.07

Sample I.D.	Upstream	Downstream	Seepage Point	O&W-101 B	P-101 A
Date Collected	3/25/87	3/25/87	3/25/87	3/25/87	3/25/87
Date Received	3/26/87	3/26/87	3/26/87	3/26/87	3/26/87

Parameters, units	Results				
Boron, mg/l	0.06	0.10	0.92	0.48	0.18

comments:

Signed:

*Frank J. Kesy*

Date:

*4/27/87*



FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS

W.D.M.R. LAB CERT. NO. 405051240

Client Address Silver Spring Road

Sampled By HJH

Scope I.D.

Billing Line No.

Liaison

J. Kesy

Name of Rep.

Supply Order No.

Telephone No. (000) 000-0000

Result Sheet No. 35777.08

Sample I.D.

Field

Blank

Date Collected

3/25/87

Date Received

3/26/87

Parameters, units

Results

Boron, mg/l

0.45

comments:

Signed:

*Donald J. Kesy*

Date:

*4/27/87*

# GROUNDWATER WELL MONITORING DATA

PERSONNEL: MJH  
SCOPE I.D.: 86H94

SITE: Silver Spring L.F.  
TEMP: 45°  
WEATHER: Cloudy - Rain

pH/Cond. Meter Serial No.

DATE	TIME	WELL #	DEPTH TO GW	TOP OF PVC TOTAL DEPTH	AMOUNT PURGED	DEPTH TO GW AFTER PURGE	TEMP @ 25°C	pH	COLOR	ODOR	TURB
3/24		OW-101B	11.00	21.54	2	DRY	6.97	9°C	LT. BR./CLEAR	NO	MOO.
3/24		P-101A	10.58	49.00	25	15.00	6.90	9°C	V. LT. BR./CLEAR	NO	SLIGHT
3/24		OW-102B	9.69	21.42	27	22.00	6.75	9°C	LT. BR./CLEAR	NO	HIGH
3/24		P-102A	9.79	47.58	6	DRY	7.11	9°C	LT. BR./CLEAR	NO	MOO.
3/24		OW-104B	14.66	23.33	1.5	DRY	7.06	9°C	LT. BR./CLEAR	NO	MOO.
3/25		P-105A	5.18	46.08	25	5.20	7.10	9°C	V. LT. VR./CLEAR	NO	SLIGHT
3/25		OW-106B	6.12	21.00	3	DRY	7.06	9°C	DK. BR./CLEAR	NO	HIGH
3/25		OW-108B	8.97	23.50	4.5	DRY	6.81	9°C	LT. BR./CLEAR	NO	HIGH
3/25		P-108A	14.83	46.50	21	20.00	6.60	9°C	LT. BR./CLEAR	NO	MOO.
3/25		OW-109B	13.37	22.54	6	20.00	6.81	9°C	V. LT. BR./CLEAR	NO	SLIGHT
3/25		P-109A	13.80	39.25	4.5	DRY	7.11	9°C	V. LT. BR.	NO	V. SLIGHT
3/25		OW-111B	7.62	22.54	4	DRY	6.88	9°C	LT. BR./CLEAR	NO	HIGH
3/25		SEEPAGE PIT	...	...	...	...	6.89	10°C	V. LT. BR.	SLIGHT	MOO.
3/24		UPSTREAM	...	...	...	...	8.22	11°C	CLEAR/V. LT. BR.	NO	SLIGHT
3/25		DOWNSTREAM	...	...	...	...	7.48	10°C	CLEAR	NO	V. SLIGHT

COMMENTS:	WELL NO.	D.T.V.	I.D.
	OW-105B	5.82	23.08
	P-111A	11.66	40.83
	P-106A	6.37	46.67

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS  
W.D.N.R. LAB CERT. NO. 405051240

Client	Silver Spring Road L.F.	Sampled By	HJH
Address		Scope I.D.	86M94
		Billing Line No.	
		Liaison	J. Kesy
Name of Rep.		Supply Order No.	
Telephone No.	(000) 000-0000	Result Sheet No.	36135.01

Sample I.D.	Upstream	Downstream	Seepage Point	OW-101 B	P-101A
Date Collected	5/26/87	5/26/87	5/26/87	5/26/87	5/26/87
Date Received	5/28/87	5/28/87	5/28/87	5/28/87	5/28/87
Parameters, units	Results				
C.O.D., mg/l	< 5	14	34	10	26
B.O.D., mg/l	< 6	< 6	< 6	< 6	< 6
Dis. Iron, mg/l	0.40	0.46	6.2	0.11	0.22
Hardness, mg/l	210	210	680	670	540
Alkalinity, mg/l	150	160	740	560	320
NO2+NO3-N, mg/l	0.54	0.57	0.76	0.10	< 0.05
NH3-N, mg/l	0.5	0.4	7.7	1.0	0.9
Barium, mg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloride, mg/l	53	54	64	54	86
Sulfates, mg/l	37	44	120	240	250
Chromium, mg/l	< 0.005	< 0.005	0.006	< 0.005	< 0.005
Mercury, mg/l	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Lead, mg/l	< 0.005	< 0.005	0.038	< 0.005	< 0.005
Cadmium, mg/l	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Arsenic, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
comments:					

Signed:

David Turiff

Date:

July 20, 1987

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS

W.D.N.R. LAB CERT. NO. 405051240

Client	Silver Spring Road L.F.	Sampled By	MJH
Address		Scope I.D.	86M94
		Billing Line No.	
		Liaison	J. Kesy
Name of Rep.		Supply Order No.	
Telephone No.	(000) 000-0000	Result Sheet No.	36135.02

Sample I.D.	OW-102 B	P-102 A	OW-104 B	P-105 A	OW-106 B
Date Collected	5/26/87	5/26/87	5/26/87	5/26/87	5/26/87
Date Received	5/28/87	5/28/87	5/28/87	5/28/87	5/28/87
Parameters, units	----- Results -----				
C.O.D., mg/l	14	14	< 5	18	6
B.O.D., mg/l	< 6	< 6	< 6	< 6	< 6
Dis. Iron, mg/l	0.11	0.22	< 0.10	1.7	0.20
Hardness, mg/l	690	550	470	720	490
Alkalinity, mg/l	510	440	340	430	380
NO2+NO3-N, mg/l	< 0.05	0.11	0.05	< 0.05	< 0.05
NH3-N, mg/l	0.9	0.7	0.2	0.2	< 0.1
Barium, mg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloride, mg/l	31	42	9	100	21
Sulfates, mg/l	270	200	130	310	160
Chromium, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Mercury, mg/l	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Lead, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Cadmium, mg/l	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Arsenic, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
comments:					

Signed: David Turiff Date: July 20, 1987

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS  
W.D.N.R. LAB CERT. NO. 405051240

Client	Silver Spring Road L.F.	Sampled By	MJH
Address		Scope I.D.	86M94
		Billing Line No.	
		Liaison	J. Kesy
Name of Rep.		Supply Order No.	
Telephone No.	(000) 000-0000	Result Sheet No.	36135.03

Sample I.D.	OW-108 B	P-108 A	OW-109 B	P-109 A	OW-111 B
Date Collected	5/26/87	5/26/87	5/26/87	5/26/87	5/26/87
Date Received	5/28/87	5/28/87	5/28/87	5/28/87	5/28/87
Parameters, units	Results				
C.O.D., mg/l	10	14	< 5	6	6
B.O.D., mg/l	< 6	< 6	< 6	< 6	< 6
Dis. Iron, mg/l	0.19	0.20	0.10	0.25	< 0.10
Hardness, mg/l	1010	1100	440	600	680
Alkalinity, mg/l	690	630	370	290	580
NO2+NO3-N, mg/l	0.67	0.40	< 0.05	0.08	0.11
NH3-N, mg/l	< 0.1	< 0.1	0.7	0.5	0.3
Barium, mg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloride, mg/l	18	25	3	40	3
Sulfates, mg/l	420	520	91	280	210
Chromium, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Mercury, mg/l	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Lead, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Cadmium, mg/l	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Arsenic, mg/l	< 0.005	< 0.005	< 0.005	0.005	< 0.005
comments:					

Signed: David Turiff Date: July 20, 1987

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS

W.D.N.R. LAB CERT. NO. 405051240

Client	Silver Spring Road L.F.	Sampled By	MJH
Address		Scope I.D.	86M94
		Billing Line No.	
		Liaison	J. Kesy
Name of Rep.		Supply Order No.	
Telephone No.	(000) 000-0000	Result Sheet No.	36135.04

Sample I.D.	OW-108 B	P-108 A	OW-109 B	P-109 A	OW-111 B
-------------	----------	---------	----------	---------	----------

Date Collected	5/26/87	5/26/87	5/26/87	5/26/87	5/26/87
----------------	---------	---------	---------	---------	---------

Date Received	5/28/87	5/28/87	5/28/87	5/28/87	5/28/87
---------------	---------	---------	---------	---------	---------

Parameters, units	Results				
-------------------	---------	--	--	--	--

Boron, mg/l	0.07	0.06	< 0.01	< 0.01	0.10
-------------	------	------	--------	--------	------

Depth to G/W, '	8.49	14.03	12.51	13.08	6.78
-----------------	------	-------	-------	-------	------

pH, s.u. (field)	6.96	7.30	7.20	7.25	7.23
------------------	------	------	------	------	------

Spec. Cond. (field)*	1417	1552	698	920	1075
----------------------	------	------	-----	-----	------

Color	Lt. Brown	V. Lt. Br.	Lt. Brown	Lt. Brown	Lt. Brown
-------	-----------	------------	-----------	-----------	-----------

Odor	No	No	No	No	No
------	----	----	----	----	----

Turbidity	Moderate	Moderate	Moderate	V. Slight	Moderate
-----------	----------	----------	----------	-----------	----------

comments: \* Specific Conductivity reported as micro-mhos/cm. at 25 degrees celsius.

Signed: David Turriff Date: July 20, 1987

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS

W.D.N.R. LAB CERT. NO. 405051240

Client	Silver Spring Road L.F.	Sampled By	MJH
Address		Scope I.D.	86M94
		Billing Line No.	
		Liaison	J. Kesy
Name of Rep.		Supply Order No.	
Telephone No.	(000) 000-0000	Result Sheet No.	36135.05

Sample I.D.	OW-102 B	P-102 A	OW-104 B	P-105 A	OW-106 B
Date Collected	5/26/87	5/26/87	5/26/87	5/26/87	5/26/87
Date Received	5/28/87	5/28/87	5/28/87	5/28/87	5/28/87
Parameters, units	----- Results -----				
Boron, mg/l	0.30	0.25	0.09	0.15	0.08
Depth to G/W, '	8.95	9.04	13.76	4.76	6.33
pH, s.u. (field)	6.99	7.22	7.06	7.09	7.50
Spec. Cond. (field)*	1045	814	1245	860	1417
Color	Lt. Brown	Lt. Brown	Lt. Brown	Lt. Brown	Lt. Brown
Odor	No	Slight	No	Slight	No
Turbidity	High	Moderate	Moderate	Slight	High

comments: \* Specific Conductivity reported as micro-mhos/cm. at 25 degrees celsius.

Signed: David Turriff Date: July 20, 1987

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS  
W.D.N.R. LAB CERT. NO. 405051240

Client	Silver Spring Road L.F.	Sampled By	MJH
Address		Scope I.D.	86M94
		Billing Line No.	
		Liaison	J. Kesy
Name of Rep.		Supply Order No.	
Telephone No.	(000) 000-0000	Result Sheet No.	36135.06

Sample I.D.	Upstream	Downstream	Seepage Point	OW-101 B	P-101 A
Date Collected	5/26/87	5/26/87	5/26/87	5/26/87	5/26/87
Date Received	5/28/87	5/28/87	5/28/87	5/28/87	5/28/87
Parameters, units	----- Results -----				
Boron, mg/l	0.13	0.05	0.70	0.34	0.13
Depth to G/W, '				10.25	9.70
pH, s.u. (field)	7.22	7.31	6.98	6.73	7.30
Spec. Cond. (field)*	490	496	1358	1291	1064
Color	Cloudy	V. Lt. Br.	Lt. Brown	Lt. Brown	V. Lt. Br.
Odor	No	No	No	No	No
Turbidity	V. Slight	V. Slight	Moderate	High	Slight

comments: \* Specific Conductivity reported as micro-mhos/cm. at 25 degrees celsius.

Signed: David Turriff Date: July 20, 1987



PERSONNEL: MJH

SCOPE I.D.: 86M94

SITE: Silver Spring L.F.

TEMP: 75° - Humid

WEATHER: Partly Cloudy

## GROUNDWATER WELL MONITORING DATA

pH/Cond. Meter Serial No.

DATE	TIME	WELL #	DEPTH TO GW	TOP OF PVC TOTAL DEPTH	AMOUNT PURGED	DEPTH TO GW AFTER PURGE	TEMP @ 25°C	PH	COLOR	ODOR	TURB
5-26		OW-101B	10.25	21.54	6.5	12.00	6.73	10°C	LT. BR.	NO	HIGH
5-26		P-101A	9.70	49.00	25	15.00	7.30	9°C	V. LT. BR.	NO	SLIGHT
5-26		OW-102B	8.95	21.42	7	11.00	6.99	9°C	LT. BR.	NO	HIGH
5-26		P-102A	9.04	47.58	6	DRY	7.22	10°C	LT. BR.	SLIGHT	MOD.
5-26		OW-104B	13.76	23.33	1.5	DRY	7.06	11°C	LT. BR.	NO	MOD.
5-26		P-105A	4.67	46.08	25	5'	7.09	10°C	LT. BR.	SLIGHT	SLIGHT
5-26		OW-106B	6.33	21.00	3	DRY	7.50	10°C	LT. BR.	NO	HIGH
5-26		OW-108B	8.49	23.50	4.5	DRY	6.96	10°C	LT. BR.	NO	MOD.
5-26		P-108A	14.03	46.50	21	22.00	7.30	10°C	V. LT. BR.	NO	MOD.
5-26		OW-109B	12.51	22.34	6	18.00	7.20	10°C	LT. BR.	NO	MOD.
5-26		P-109A	13.08	39.25	4.5	DRY	7.25	10°C	V. LT. BR.	NO	V. SLIGHT
5-26		OW-111B	6.78	22.54	4	DRY	7.23	10°C	LT. BR.	NO	MOD.
5-26		SEEPAGE	...	...	..	---	6.98	13°C	LT. BR.	NO	MOD.
5-26		UPSTREAM	...	...	..	---	7.22	14°C	CLOUDY	NO	V. SLIGHT
5-26		DOWNSTREAM	...	...	..	---	7.31	15°C	V. LT. BR.	NO	V. SLIGHT

COMMENTS:	WELL NO.	D.I.V.	I.D.
	OW-105B	5.70	23.08
	P-111A	10.39	40.83
	P-106A	6.29	46.67

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS

W.D.N.R. LAB CERT. NO. 405051240

Client	Silver Spring Road L.F.	Sampled By	MJH
Address		Scope I.D.	86M94
		Billing Line No.	
		Liaison	J. Kesy
Name of Rep.		Supply Order No.	
Telephone No.	(000) 000-0000	Result Sheet No.	36476.01.

Sample I.D.	Upstream	Downstream	Seepage Point	OW-101 B	P-101 A
Date Collected	7/28/87	7/28/87	7/28/87	7/28/87	7/28/87
Date Received	7/29/87	7/29/87	7/29/87	7/29/87	7/29/87
Parameters, units	Results				
C.O.D., mg/l	11	14	16	25	20
B.O.D., mg/l	< 6 *	< 6 *	< 6 *	6 *	< 6 *
Dis. Iron, mg/l	0.42	0.68	0.61	< 0.10	0.67
Hardness, mg/l	190	220	210	740	670
Alkalinity, mg/l	150	160	170	540	410
NO2+NO3-N, mg/l	0.07	0.09	0.06	< 0.05	< 0.05
NH3-N, mg/l	0.3	0.1	0.4	0.7	0.4
Barium, mg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorides, mg/l	43	40	44	57	80
Sulfates, mg/l	40	45	44	280	260
Chromium, mg/l	0.005	0.006	0.005	< 0.005	< 0.005
Mercury, mg/l	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Lead, mg/l	0.005	0.009	0.005	< 0.005	< 0.005
Cadmium, mg/l	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Arsenic, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
comments:	* Reset value.				

Signed:

*David Turriff*

Date:

*September 2, 1987*

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS  
W.D.N.R. LAB CERT. NO. 405051240

Client	Silver Spring Road L.F.	Sampled By	MJH
Address		Scope I.D.	86M94
		Billing Line No.	
		Liaison	J. Kesy
Name of Rep.		Supply Order No.	
Telephone No.	(000) 000-0000	Result Sheet No.	36476.06

Sample I.D.	Upstream	Downstream	Seepage Point	OW-101 B	P-101 A
Date Collected	7/28/87	7/28/87	7/28/87	7/28/87	7/28/87
Date Received	7/29/87	7/29/87	7/29/87	7/29/87	7/29/87
Parameters, units	----- Results -----				
Boron, mg/l	0.19	0.28	0.29	0.42	0.22
Depth to G/W, '				11.54	11.17
pH, s.u. (field)	6.65	6.84	6.73	6.87	6.64
Spec. Cond. (field)*	443	479	477	1381	1258
Color	V. Lt. Br.	V. Lt. Br.	Lt. Brown	Lt. Brown	V. Lt. Br.
Odor	None	None	None	None	None
Turbidity	Slight	Slight	Slight	Moderate	Slight

comments:

Signed:

David Turff

Date:

September 1, 1987

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS  
W.D.N.R. LAB CERT. NO. 405051240

Client	Silver Spring Road L.F.	Sampled By	MJH
Address		Scope I.D.	86M94
		Billing Line No.	
		Liaison	J. Kesy
Name of Rep.		Supply Order No.	
Telephone No.	(000) 000-0000	Result Sheet No.	36476.02

Sample I.D.	OW-102 B	P-102 A	OW-104 B	P-105 A	OW-106 B
Date Collected	7/28/87	7/28/87	7/28/87	7/28/87	7/28/87
Date Received	7/29/87	7/29/87	7/29/87	7/29/87	7/29/87
Parameters, units	Results				
C.O.D., mg/l	53	20	< 5	< 5	< 5
B.O.D., mg/l	< 6 *	7 *	10 *	< 6 *	< 6 *
Dis. Iron, mg/l	< 0.10	0.51	< 0.10	< 0.10	< 0.10
Hardness, mg/l	630	590	540	720	550
Alkalinity, mg/l	480	460	330	410	400
NO2+NO3-N, mg/l	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
NH3-N, mg/l	1.4	1.1	0.7	0.5	< 0.1
Barium, mg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorides, mg/l	63	47	9	100	18
Sulfates, mg/l	180	160	160	290	130
Chromium, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Mercury, mg/l	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Lead, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Cadmium, mg/l	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Arsenic, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
comments:	* Reset value.				

Signed: David Turrell Date: September 2, 1987

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS  
W.D.N.R. LAB CERT. NO. 405051240

Client	Silver Spring Road L.F.	Sampled By	MJH
Address		Scope I.D.	86M94
		Billing Line No.	
		Liaison	J. Kesy
Name of Rep.		Supply Order No.	
Telephone No.	(000) 000-0000	Result Sheet No.	36476.05

Sample I.D.	OW-102 B	P-102 A	OW-104 B	P-105 A	OW-106 B
Date Collected	7/28/87	7/28/87	7/28/87	7/28/87	7/28/87
Date Received	7/29/87	7/29/87	7/29/87	7/29/87	7/29/87

Parameters, units ----- Results -----

Boron, mg/l	0.31	0.34	0.10	0.23	0.05
Depth to G/W, '	10.33	10.41	15.85	5.68	7.74
pH, s.u. (field)	6.77	7.06	7.02	6.95	7.05
Spec. Cond. (field)*	1180	1105	820	1100	805
Color	Lt. Brown	Cloudy	Dr. Brown	Lt. Brown	Dr. Brown
Odor	None	Moderate	None	Slight	None
Turbidity	High	Slight	High	High	Moderate

comments:

Signed: David Turiff Date: September 1, 1987

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS  
W.D.N.R. LAB CERT. NO. 405051240

Client	Silver Spring Road L.F.	Sampled By	MJH
Address		Scope I.D.	86M94
		Billing Line No.	
		Liaison	J. Kesy
Name of Rep.		Supply Order No.	
Telephone No.	(000) 000-0000	Result Sheet No.	36476.03

Sample I.D.	OW-108 B	P-108 A	OW-109 B	P-109 A	OW-111 B
Date Collected	7/28/87	7/28/87	7/28/87	7/28/87	7/28/87
Date Received	7/29/87	7/29/87	7/29/87	7/29/87	7/29/87
Parameters, units	Results				
C.O.D., mg/l	< 5	< 5	< 5	< 5	< 5
B.O.D., mg/l	< 6 *	< 6 *	< 6 *	< 6 *	< 6 *
Dis. Iron, mg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Hardness, mg/l	1020	1150	470	650	830
Alkalinity, mg/l	710	640	390	310	590
NO2+NO3-N, mg/l	0.22	0.69	< 0.05	< 0.05	0.06
NH3-N, mg/l	< 0.1	1.0	1.0	0.5	0.2
Barium, mg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorides, mg/l	17	23	2	42	3
Sulfates, mg/l	390	450	75	250	200
Chromium, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Mercury, mg/l	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Lead, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Cadmium, mg/l	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Arsenic, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
comments:	* Reset value.				

Signed: David Turriff Date: September 2, 1987

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

### LABORATORY ANALYSIS RESULTS

W.D.N.R. LAB CERT. NO. 405051240

Client	Silver Spring Road L.F.	Sampled By	MJH
Address		Scope I.D.	86M94
		Billing Line No.	
		Liaison	J. Kesy
Name of Rep.		Supply Order No.	
Telephone No.	(000) 000-0000	Result Sheet No.	36476.04

Sample I.D.	OW-108 B	P-108 A	OW-109 B	P-109 A	OW-111 B
Date Collected	7/28/87	7/28/87	7/28/87	7/28/87	7/28/87
Date Received	7/29/87	7/29/87	7/29/87	7/29/87	7/29/87

[illegible]

Boron, mg/l	0.41	0.07	0.14	0.07	0.14
Depth to G/W, '	11.06	16.60	15.42	15.75	9.67
pH, s.u. (field)	6.66	6.84	7.03	6.82	6.68
Spec. Cond. (field)*	1517	1562	712	978	1172
Color	Lt. Brown	V. Lt. Br.	Lt. Brown	V. Lt. Br.	Lt. Brown
Odor	None	None	None	None	None
Turbidity	Moderate	Slight	Moderate	Slight	High

**comments:**

Signed:

David Turiff

Date: September 1, 1987

GROUNDWATER WELL MONITORING DATA

PERSONNEL: MJH  
SCOPE I.D.: 86494

SITE: Silver Spring L.F.  
TEMP: 65°  
WEATHER: Partly Cloudy

pH/Cond. Meter Serial No.

DATE	TIME	WELL #	DEPTH TO GH	TOP OF PVC TOTAL DEPTH	AMOUNT PURGED	DEPTH TO GW AFTER PURGE	TEMP	CONDUCT	PH	COLOR	ODOR	TURB
9-28		OW-107B	10.68	21.54	6.5	11.00	7.00	1231	13°C	LT. BR.	NO	HIGH
9-28		P-101A	10.19	49.00	20.0	20.00	6.87	1165	13°C	CLOUDY	NO	V. SLIGHT
9-28		OW-102B	9.40	21.42	6.5	10.00	6.93	1045	13°C	LT. BR.	NO	HIGH
9-28		P-102A	9.43	47.58	6.5	DRY	7.10	993	13°C	LT. BR.	NO	MOD.
9-28		OW-104B	14.74	23.33	2.5	DRY	6.82	705	13°C	LT. BR.	NO	HIGH
9-28		P-105A	4.99	46.08	25.0	5.25	6.95	1203	13°C	LT. BR.	NO	HIGH
9-28		OW-106B	6.53	21.00	3.5	DRY	6.87	856	13°C	LT. BR.	NO	HIGH
9-28		OW-108B	8.95	23.50	2.5	DRY	6.87	1453	13°C	LT. BR.	NO	MOD.
9-28		P-108A	14.40	46.50	20	25.00	6.72	1578	13°C	V. LT. BR.	NO	SLIGHT
9-28		OW-109B	13.07	22.54	6	18.00	6.68	750	13°C	LT. BR.	NO	MOD.
9-28		P-109A	13.52	39.25	5	DRY	6.75	976	13°C	V. LT. BR.	NO	SLIGHT
9-28		OW-111B	7.27	22.54	3	DRY	6.68	1190	13°C	LT. BR.	NO	HIGH
9-28		SEEPAGE	---	---	---	---	6.88	1384	14°C	LT. BR.	V. SLIGHT	MOD.
9-28		UPSTREAM	---	---	---	---	7.11	769	17°C	V. LT. BR.	NO	V. SLIGHT
9-28		DOWNSTREAM	---	---	---	---	7.29	797	17°C	V. LT. BR.	NO	SLIGHT

COMMENTS:	WELL NO.	D.T.V.	T.D.
	OW-105B	5.89	23.08
	P-111A	11.10	40.83
	P-106A	6.29	46.67



FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS  
W.D.N.R. LAB CERT. NO. 405051240

Client	Silver Springs Road L.F.	Sampled By	MJH
Address		Scope I.D.	86M94
		Billing Line No.	
		Liaison	J. Kesy
Name of Rep.		Supply Order No.	
Telephone No.	(000) 000-0000	Result Sheet No.	36840.01

Sample I.D.	Upstream	Downstream	Seepage Point	OW-101 B	P-101 A
Date Collected	9/28/87	9/28/87	9/28/87	9/28/87	9/28/87
Date Received	9/30/87	9/30/87	9/30/87	9/30/87	9/30/87
Parameters, units	Results				
C.O.D., mg/l	< 5	5	530	25	35
B.O.D., mg/l	< 6	< 6	< 6	< 6	< 6
Dis. Iron, mg/l	0.28	0.39	230	0.86	3.4
Hardness, mg/l	340	300	860	760	1300
Alkalinity, mg/l	250	280	800	520	400
NO2+NO3-N, mg/l	1.1	1.2	0.05	0.12	0.08
NH3-N, mg/l	0.3	3.2	6.8	0.6	0.3
Barium, mg/l	< 1.0	< 1.0	1.3	< 1.0	< 1.0
Chlorides, mg/l	95	90	66	60	80
Sulfates, mg/l	68	84	120	280	220
Chromium, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Mercury, mg/l	< 0.0005	< 0.0005	0.0007	< 0.0005	< 0.0005
Lead, mg/l	< 0.005	< 0.005	0.17	< 0.005	< 0.005
Cadmium, mg/l	< 0.0010	< 0.0010	0.0094	< 0.0010	< 0.0010
Arsenic, mg/l	< 0.005	< 0.005	0.220	< 0.005	< 0.005
comments:					

Signed: David Turriff Date: November 5, 1987

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS  
W.D.N.R. LAB CERT. NO. 405051240

Client	Silver Springs Road L.F.	Sampled By	HJH
Address		Scope I.D.	86M94
		Billing Line No.	
		Liaison	J. Kesy
Name of Rep.		Supply Order No.	
Telephone No.	(000) 000-0000	Result Sheet No.	36840.06

Sample I.D.	Upstream	Downstream	Seepage Point	OW-101 B	P-101 A
Date Collected	9/28/87	9/28/87	9/28/87	9/28/87	9/28/87
Date Received	9/30/87	9/30/87	9/30/87	9/30/87	9/30/87
Parameters, units	Results				
Boron, mg/l	0.21	0.26	1.2	0.60	0.29
Depth to G/W, '				10.68	10.19
pH, s.u. (field)	7.11	7.29	6.88	7.00	6.87
Sepec. Cond. (field)*	769	797	1384	1231	1165
Color	V. Lt. Br.	V. Lt. Br.	Lt. Brown	Lt. Brown	Cloudy
Odor	No	No	V. Slight	No	No
Turbidity	V. Slight	Slight	Moderate	High	V. Slight

comments: \* Specific Conductivity reported as micro-uhmos./cm. at 25 degrees celsius.

Signed: David Turiff Date: November 5, 1987

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS  
W.D.N.R. LAB CERT. NO. 405051240

Client	Silver Springs Road L.F.	Sampled By	MJH
Address		Scope I.D.	86M94
		Billing Line No.	
		Liaison	J. Kesy
Name of Rep.		Supply Order No.	
Telephone No.	(000) 000-0000	Result Sheet No.	36840.02

Sample I.D.	OW-102 B	P-102 A	OW-104 B	P-105 A	OW-106 B
Date Collected	9/28/87	9/28/87	9/28/87	9/28/87	9/28/87
Date Received	9/30/87	9/30/87	9/30/87	9/30/87	9/30/87
Parameters, units	Results				
C.O.D., mg/l	20	25	5	10	15
B.O.D., mg/l	< 6	< 6	< 6	< 6	< 6
Dis. Iron, mg/l	2.3	1.1	< 0.10	2.1	< 0.10
Hardness, mg/l	900	680	540	820	570
Alkalinity, mg/l	440	420	320	420	390 *
NO2+NO3-N, mg/l	0.12	0.17	0.12	0.06	0.08
NH3-N, mg/l	1.2	1.2	0.3	0.2	0.1
Barium, mg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorides, mg/l	45	200	5	75	15
Sulfates, mg/l	180	200	150	320	170
Chromium, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Mercury, mg/l	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Lead, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Cadmium, mg/l	< 0.0010	< 0.0010	< 0.0010	< 0.0010	0.0029
Arsenic, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
comments:	* Holding time was exceeded.				

Signed: David Turriff Date: November 5, 1987

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS  
W.D.N.R. LAB CERT. NO. 405051240

Client	Silver Springs Road L.F.	Sampled By	MJH
Address		Scope I.D.	86M94
		Billing Line No.	
		Liaison	J. Kesy
Name of Rep.		Supply Order No.	
Telephone No.	(000) 000-0000	Result Sheet No.	36840.05

Sample I.D.	OW-102 B	P-102 A	OW-104 B	P-105 A	OW-106 B
Date Collected	9/28/87	9/28/87	9/28/87	9/28/87	9/28/87
Date Received	9/30/87	9/30/87	9/30/87	9/30/87	9/30/87
Parameters, units	----- Results -----				
Boron, mg/l	0.45	0.42	0.14	0.27	0.19
Depth to G/W, '	9.40	9.43	14.74	4.99	6.53
pH, s.u. (field)	6.93	7.10	6.82	6.95	6.87
Seqc. Cond. (field)*	1045	993	705	1203	856
Color	Lt. Brown	Lt. Brown	Lt. Brown	Lt. Brown	Lt. Brown
Odor	No	No	No	No	No
Turbidity	High	Moderate	High	High	V. High

comments: \* Specific Conductivity reported as micro-uhmos./cm. at 25 degrees celsius.

Signed: David Turriff Date: November 5, 1987

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS

W.D.N.R. LAB CERT. NO. 405051240

Client	Silver Springs Road L.F.	Sampled By	MJH
Address		Scope I.D.	861194
		Billing Line No.	
		Liaison	J. Kesy
Name of Rep.		Supply Order No.	
Telephone No.	(000) 000-0000	Result Sheet No.	36840.03

Sample I.D.	OW-108 B	P-108 A	OW-109 B	P-109 A	OW-111 B
Date Collected	9/28/87	9/28/87	9/28/87	9/28/87	9/28/87
Date Received	9/30/87	9/30/87	9/30/87	9/30/87	9/30/87
Parameters, units	Results				
C.O.D., mg/l	< 5	< 5	< 5	< 5	5
B.O.D., mg/l	< 6	< 6	< 6	< 6	< 6
Dis. Iron, mg/l	< 0.10	0.28	< 0.10	< 0.10	< 0.10
Hardness, mg/l	1100	1400	490	620	930
Alkalinity, mg/l *	710	630	390	300	620
NO <sub>2</sub> +NO <sub>3</sub> -N, mg/l	0.65	0.10	0.08	0.11	0.07
NH <sub>3</sub> -N, mg/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Barium, mg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorides, mg/l	13	26	1	40	1
Sulfates, mg/l	380	530	88	290	220
Chromium, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Mercury, mg/l	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Lead, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Cadmium, mg/l	< 0.0010	< 0.0010	< 0.0010	0.0012	< 0.0010
Arsenic, mg/l	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
comments:	* Holding time was exceeded.				

Signed: David Turiff Date: November 6, 1987

FOTH AND VAN DYKE  
Engineers/Architects  
2737 S. Ridge Road  
P.O. Box 19012  
Green Bay, Wisc. 54307-9012

LABORATORY ANALYSIS RESULTS  
W.D.N.R. LAB CERT. NO. 405051240

Client Address	Silver Springs Road L.F.	Sampled By	MJH
		Scope I.D.	86M94
		Billing Line No.	
		Liaison	J. Kesy
Name of Rep.		Supply Order No.	
Telephone No.	(000) 000-0000	Result Sheet No.	36840.04

Sample I.D.	OW-108 B	P-108 A	OW-109 B	P-109 A	OW-111 B
Date Collected	9/28/87	9/28/87	9/28/87	9/28/87	9/28/87
Date Received	9/30/87	9/30/87	9/30/87	9/30/87	9/30/87

Parameters, units	Results				
Boron, mg/l	0.59	0.26	0.13	0.12	0.23
Depth to G/W, '	8.95	14.40	13.07	13.52	7.27
pH, s.u. (field)	6.87	6.72	6.68	6.75	6.68
Sepec. Cond. (field)*	1453	1578	750	976	1190
Color	Lt. Brown	V. Lt. Br.	Lt. Brown	V. Lt. Br.	Lt. Brown
Odor	No	No	No	No	No
Turbidity	Moderate	Slight	Moderate	Slight	High

comments: \* Specific Conductivity reported as micro-uhmos./cm. at 25 degrees celsius.

Signed: David Turiff Date: November 5, 1987

Parameter (mg/l)	OH-101B					P-101A					PAL	ES
	1/87	3/87	5/87	7/87	9/87	1/87	3/87	5/87	7/87	9/87		
COO	.13	24	10	25	25	29	23	26	20	35		
800	<6	<6	<6	6	<6	<6	<6	<6	<6	<6		
Dis. Iron	<0.10	0.16	0.11	<0.10	0.86	3.4	3.4	0.22	0.67	3.4	.15	.3
Hardness	660	710	670	740	760	620	680	540	670	1300		
Alkalinity	520	540	560	540	520	410	420	320	410	400		
NO <sub>2</sub> +NO <sub>3</sub> -N	0.06	<0.05	0.10	<0.05	0.12	<0.05	<0.05	<0.05	<0.05	0.06	2	10
NH <sub>3</sub> -N	0.65	0.1	1.0	0.7	0.6	0.42	0.1	0.9	0.4	0.3		
Barium	<1.0	<1.0	<1.0	<1.0	<1.0*	<1.0	<1.0	<1.0	<1.0	<1.0*	.2	1
Chloride	80	65	54	57	60	130	84	86	80	80	125	250
Sulfates	240	260	240	280	280	260	260	250	260	220	125	250
Chromium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	.005	.05
Mercury	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	.0002	.002
Lead	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	.005	.05
Cadmium	<0.001	<0.001	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.001	.001	.01
Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	.005	.05
Boron	0.23	0.48	0.36	0.42	0.6	0.16	0.18	0.13	0.22	0.29		
Cond. @ 25°	1410	1397	1291	1381	1231	1362	1334	1064	1258	1165		
pH	6.48	6.97	6.73	6.87	7.00	6.67	6.90	7.3	6.64	6.87		

Parameter (mg/l)	OM-1028					P-102A					PAL	ES
	1/87	3/87	5/87	7/87	9/87	1/87	3/87	5/87	7/87	9/87		
COO	.28	34	14	53	20	49	<5	14	20	25		
BOD	7	<6	<6	<6	<6	<6	7	<6	7	<6		
Dis. Iron	<0.10	<0.10	0.11	<0.10	2.3	<0.10	<0.10	0.22	0.51	1.1	.15	.3
Hardness	540	370	690	630	900	460	600	550	590	680		
Alkalinity	470	500	510	480	440	340	430	440	460	420		
NO <sub>2</sub> +NO <sub>3</sub> -N	<0.05	0.08	<0.05	<0.05	0.12	0.19	0.25	0.11	<0.05	0.17	2	10
NH <sub>3</sub> -N	1.0	0.1	0.9	1.4	1.2	0.57	0.1	0.7	1.1	1.2		
Barium	<1.0	<1.0	<1.0	<1.0	<1.0*	<1.0	<1.0	<1.0	<1.0	<1.0	.2	1
Chloride	54	24	31	63	45	75	38	42	47	200	125	250
Sulfates	210	240	270	180	180	230	220	200	160	200	125	250
Chromium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	.005	.05
Mercury	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	.0002	.002
Lead	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	.005	.05
Cadmium	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	.001	.01
Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	.005	.05
Boron	0.16	0.44	0.30	0.31	0.45	0.23	0.33	0.25	0.34	0.42		
Cond. @ 25°	1305	1256	1045	1180	1045	1156	1175	814	1105	993		
pH	6.79	6.75	6.99	6.77	6.93	7.0	7.11	7.22	7.06	7.10		



Parameter (mg/l)	OH-104B				P-105A				PAL	ES
	1/87	3/87	5/87	7/87	9/87	1/87	3/87	5/87	7/87	9/87
COO	.9	21	<5	<5	5	18	16	18	<5	10
BOO	<6	<6	<6	10	<6	<6	<6	<6	<6	<6
Dis. Iron	<0.10	<0.10	<0.10	<0.10	<0.10	2.9	2.8	1.7	<0.10	2.1
Hardness	380	540	470	540	540	730	760	720	720	820
Alkalinity	340	340	340	330	320	420	430	430	410	420
NO <sub>2</sub> +NO <sub>3</sub> -N	<0.05	<0.05	0.05	<0.05	0.12	<0.05	<0.05	<0.05	<0.05	0.06
NH <sub>3</sub> -N	0.10	0.2	0.2	0.7	0.3	0.27	0.3	0.2	0.5	0.2
Barium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloride	11	14	9	9	5	150	100	100	100	75
Sulfates	120	170	130	160	150	300	300	310	290	320
Chromium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Mercury	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Lead	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Boron	<0.02	0.06	0.09	0.10	0.14	0.36	0.25	0.15	0.23	0.27
Cond. @ 25°	848	954	1245	820	705	1536	1463	860	1100	1203
pH	6.70	7.06	7.06	7.02	6.82	6.75	7.10	7.09	6.95	6.93



Parameter (mg/l)	P-108A				P-109A				PAL	ES	
	1/87	3/87	5/87	7/87	9/87	1/87	3/87	5/87			7/87
COO	.11	<5	14	<5	<5	<5	<5	6	<5	<5	
BOD	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	
Dis. Iron	0.16	0.21	0.20	<0.10	<0.10	<0.10	<0.10	0.25	<0.10	<0.10	
Hardness	960	1160	1100	1150	600	620	650	600	620	620	
Alkalinity	640	670	630	640	290	290	310	290	300	300	
NO <sub>2</sub> +NO <sub>3</sub> -N	<0.05	0.20	0.40	0.69	<0.05	<0.05	<0.05	0.08	<0.05	0.11	
NH <sub>3</sub> -N	0.17	0.20	<0.1	1.0	<0.10	0.2	0.5	0.5	<0.1	<0.1	
Barium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Chloride	27	22	25	23	46	44	42	40	40	40	
Sulfates	490	560	520	450	300	290	250	280	290	290	
Chromium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Mercury	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Lead	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Cadmium	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0012	
Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	
Boron	0.28	0.15	0.06	0.07	0.12	0.05	0.05	<0.01	<0.005	<0.005	
Cond. @ 25°	1348	1870	1552	1562	1104	1078	978	920	0.07	0.13	
pH	6.31	6.6	7.30	6.84	6.93	7.11	6.82	7.25	6.82	976	

Parameter

(mg/l)

Parameter (mg/l)	Upstream					Downstream					PAL	ES
	1/87	3/87	5/87	7/87	9/87	1/87	3/87	5/87	7/87	9/87		
COO	14	26	<5	11	<5	9	26	14		5		
BOO	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6		
Dis. Iron	0.18	0.31	0.40	0.42	0.28	0.32	0.44	0.46	0.68	0.39	.15	.3
Hardness	250	300	210	190	340	250	370	210	220	300		
Alkalinity	170	210	150	150	250	200	250	160	160	280		
NO <sub>3</sub> -N	0.23	0.64	0.54	0.07	1.1	0.17	0.92	0.57	0.09	1.2	2	10
NH <sub>3</sub> -N	0.13	0.1	0.5	0.3	0.3	0.18	0.4	0.4	0.1	3.2		
Barium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	.2	1
Chloride	240	170	53	43	95	230	170	54	40	90	125	250
Sulfates	44	62	37	40	68	56	80	44	45	84	125	250
Chromium	0.005	<0.005	<0.005	0.005	<0.005	0.005	<0.005	<0.005	0.006	<0.005	.005	.05
Mercury	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	.0002	.002
Lead	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	0.009	<0.005	.005	.05
Cadmium	<0.001	<0.001	<0.001	<0.0010	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	.001	.01
Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	.005	.05
Boron	<0.02	0.06	0.13	0.19	0.21	0.08	0.10	0.13	0.28	0.26		
Cond. @ 25°	975	971	490	443	769	981	1049	490	479	797		
pH	6.91	8.22	7.22	6.65	7.11	7.13	7.48	7.22	6.84	7.29		

Parameter (mg/l)	Seepage Pt.					PAL	ES
	1/87	3/87	5/87	7/87	9/87		
<u>Frozen</u>							
COO		26	34	16	530		
BOO		<6	<6	<6	<6		
Dis. Iron		5.7	6.2	0.61	230	.15	.3
Hardness		790	680	210	860		
Alkalinity		660	740	170	800		
NO <sub>2</sub> +NO <sub>3</sub> -N		0.44	0.76	0.06	0.05		10
NH <sub>3</sub> -N		0.1	7.7	0.4	6.8		
Barium		<1.0	<1.0	<1.0		.2	1
Chloride		55	64	44	66	125	250
Sulfates		250	120	44	120	125	250
Chromium		<0.005	0.006	0.005	<0.005	.005	.05
Mercury		<0.0005	<0.0005	<0.0005	0.0007	.0002	.002
Lead		<0.005	0.038	0.005	0.17	.005	.05
Cadmium		<0.001	<0.001	<0.001	0.0094	.001	.01
Arsenic		<0.005	<0.005	<0.005	<0.005	.005	.05
Boron		0.92	0.70	0.29	1.169		
Cond. @ 25°		1591	1358	477	1384		
pH		6.89	6.98	6.73	6.88		

APPENDIX B-2

Volatile Organic Compounds (VOCs)

# ANALYTICAL REPORT

WISCONSIN LAB CERTIFICATION NO. 737053130

FOR:

Foth & Van Dyke  
2737 S. Ridge Road  
P.O. Box 11997  
Green Bay, WI 54307-1997  
  
Attn: Mike Hastreiter

P.O. # Silver Spring

SAMPLED BY: Client

DATE REC'D: 2-2-87

REPORT DATE: 3-17-87

APPROVED BY: MCH

## VOC Analysis (ug/l)

	Detection Limit	OW-101B	P-102A	OW-102B	OW-104B	P-105A
Benzene	0.2	X	X	X	X	X
Bromoform	0.5	X	X	X	X	X
Bromomethane	1.0	X	X	X	X	X
Carbon Tetrachloride	0.1	X	X	X	X	X
Chlorobenzene	0.1	X	X	X	X	X
Chloroethane	1.0	X	X	X	X	X
2-Chloroethylvinyl Ether	2.0	X	X	X	X	X
Chloroform	0.1	X	X	X	X	X
Chloromethane	6.0	X	X	X	X	X
Dibromochloromethane	0.1	X	X	X	X	X
1,2-Dichlorobenzene	0.3	X	X	X	X	X
1,3-Dichlorobenzene	0.3	X	X	X	X	X
1,4-Dichlorobenzene	0.3	X	X	X	X	X
Dichlorobromomethane	0.1	X	X	X	X	X
1,1-Dichloroethane	0.1	0.6	0.7	1.2	X	X
1,2-Dichloroethane	0.3	X	X	X	X	X
1,1-Dichloroethylene	0.5	X	X	X	X	X
1,2-Dichloroethylene	0.3	23.8	4.0	13.9	X	X
Dichloromethane	0.2	X	X	0.3	X	X
1,2-Dichloropropane	0.5	X	X	X	X	X
cis-1,3-Dichloropropene	0.3	X	X	X	X	X
trans-1,3-Dichloropropene	1.0	X	X	X	X	X
Ethylbenzene	0.2	X	X	X	X	X
1,1,2,2-Tetrachloroethane	0.1	X	X	X	X	X
Tetrachloroethylene	0.1	X	X	X	X	X
Toluene	0.1	X	X	X	X	X
1,1,1-Trichloroethane	0.1	X	X	X	X	X
1,1,2-Trichloroethane	0.1	X	X	X	X	X
Trichloroethylene	0.1	X	X	1.0	X	X
Vinyl Chloride	2.0	12.5	3.0	23.1	X	39.9
Trichlorofluoromethane	0.2	X	X	X	X	X
Dichlorodifluoromethane	2.0	X	X	X	X	X
Zimpro Analytical No.		25288	25289	25290	25291	25292

X = Analyzed but not detected

All analyses have been conducted in accordance with the Zimpro Inc. Analytical Services Quality Assurance Program



**ANALYTICAL REPORT**

WISCONSIN LAB CERTIFICATION NO. 737053130

FOR:

Foth & Van Dyke  
2737 S. Ridge Road  
P.O. Box 11997  
Green Bay, WI 54307-1997

Attn: Mike Hastreiter

P.O. # Silver Spring

SAMPLED BY: Client

DATE REC'D: 2-2-87

REPORT DATE: 3-17-87

APPROVED BY: MCCH

VOC Analysis (ug/l)

	Detection Limit	P-101A
Benzene	2.0	X
Bromoform	5.0	X
Bromomethane	10.0	X
Carbon Tetrachloride	1.0	X
Chlorobenzene	1.0	X
Chloroethane	10.0	X
2-Chloroethylvinyl Ether	20.0	X
Chloroform	1.0	X
Chloromethane	60.0	X
Dibromochloromethane	1.0	X
1,2-Dichlorobenzene	3.0	X
1,3-Dichlorobenzene	3.0	X
1,4-Dichlorobenzene	3.0	X
Dichlorobromomethane	1.0	X
1,1-Dichloroethane	1.0	X
1,2-Dichloroethane	3.0	X
1,1-Dichloroethylene	5.0	X
1,2-Dichloroethylene	3.0	X
Dichloromethane	2.0	X
1,2-Dichloropropane	5.0	X
cis-1,3-Dichloropropene	3.0	X
trans-1,3-Dichloropropene	10.0	X
Ethylbenzene	2.0	X
1,1,2,2-Tetrachloroethane	1.0	X
Tetrachloroethylene	1.0	X
Toluene	1.0	X
1,1,1-Trichloroethane	1.0	X
1,1,2-Trichloroethane	1.0	X
Trichloroethylene	1.0	X
Vinyl Chloride	20.0	336.
Trichlorofluoromethane	2.0	X
Dichlorodifluoromethane	20.0	X

Zimpro Analytical No.

25287

X = Analyzed but not detected

All analyses have been conducted in accordance with the Zimpro Inc. Analytical Services Quality Assurance Program.

**ANALYTICAL REPORT**

WISCONSIN LAB CERTIFICATION NO. 737053130

FOR:

Foth & Van Dyke  
 2737 S. Ridge Road  
 P.O. Box 11997  
 Green Bay, WI 54307-1997

Attn: Mike Hastreiter

P.O. # Silver Spring

SAMPLED BY: Client

DATE REC'D: 2-2-87

REPORT DATE: 3-17-87

APPROVED BY: MCH

VOC Analysis (ug/l)

	Detection Limit	OW-106B	P-108A	OW-108B	P-109A	OW-109B
Benzene	0.2	X	X	X	X	X
Bromoform	0.5	X	X	X	X	X
Bromomethane	1.0	X	X	X	X	X
Carbon Tetrachloride	0.1	X	X	X	X	X
Chlorobenzene	0.1	X	X	X	X	X
Chloroethane	1.0	X	X	X	X	X
2-Chloroethylvinyl Ether	2.0	X	X	X	X	X
Chloroform	0.1	X	X	X	X	X
Chloromethane	6.0	X	X	X	X	X
Dibromochloromethane	0.1	X	X	X	X	X
1,2-Dichlorobenzene	0.3	X	X	X	X	X
1,3-Dichlorobenzene	0.3	X	X	X	X	X
1,4-Dichlorobenzene	0.3	X	X	X	X	X
Dichlorobromomethane	0.1	X	X	X	X	X
1,1-Dichloroethane	0.1	X	X	X	X	X
1,2-Dichloroethane	0.3	X	X	X	X	X
1,1-Dichloroethylene	0.5	X	X	X	X	X
1,2-Dichloroethylene	0.3	X	X	X	X	X
Dichloromethane	0.2	X	X	X	X	X
1,2-Dichloropropane	0.5	X	X	X	X	X
cis-1,3-Dichloropropene	0.3	X	X	X	X	X
trans-1,3-Dichloropropene	1.0	X	X	X	X	X
Ethylbenzene	0.2	X	X	X	X	X
1,1,2,2-Tetrachloroethane	0.1	X	X	X	X	X
Tetrachloroethylene	0.1	X	X	0.2	X	X
Toluene	0.1	X	0.1	X	X	0.1
1,1,1-Trichloroethane	0.1	X	X	X	X	X
1,1,2-Trichloroethane	0.1	X	X	X	X	X
Trichloroethylene	0.1	X	X	X	X	X
Vinyl Chloride	2.0	X	X	X	X	X
Trichlorofluoromethane	0.2	X	X	X	X	X
Dichlorodifluoromethane	2.0	X	X	X	X	X

Zimpro Analytical No.

25293

25294

25295

25296

25297

X = Analyzed but not detected



ENVIRONMENTAL & ENERGY SYSTEMS  
ROTHSCHILD, WISCONSIN 54475  
PH. 715 / 359-7211 TELEX 29-0485

## ANALYTICAL REPORT

WISCONSIN LAB CERTIFICATION NO. 737053130

FOR:

Foth & Van Dyke  
2737 S. Ridge Road  
P.O. Box 11997  
Green Bay, WI 54307-1997

Attn: Mike Hastreiter

P.O. # Silver Spring

SAMPLED BY: Client

DATE REC'D: 2-2-87

REPORT DATE: 3-17-87

APPROVED BY: MICHA

### VOC Analysis (ug/l)

	Detection Limit	OW-111B	Upstream	Downstream	Field Blank	Trip Blank
Benzene	0.2	X	X	X	X	X
Bromoform	0.5	X	X	X	X	X
Bromomethane	1.0	X	X	X	X	X
Carbon Tetrachloride	0.1	X	X	X	X	X
Chlorobenzene	0.1	X	X	X	X	X
Chloroethane	1.0	X	X	X	X	X
2-Chloroethylvinyl Ether	2.0	X	X	X	X	X
Chloroform	0.1	X	1.0	0.9	X	X
Chloromethane	6.0	X	X	X	X	X
Dibromochloromethane	0.1	X	X	X	X	X
1,2-Dichlorobenzene	0.3	X	X	X	X	X
1,3-Dichlorobenzene	0.3	X	X	X	X	X
1,4-Dichlorobenzene	0.3	X	X	X	X	X
Dichlorobromomethane	0.1	X	0.4	0.2	X	X
1,1-Dichloroethane	0.1	X	X	X	X	X
1,2-Dichloroethane	0.3	X	X	X	X	X
1,1-Dichloroethylene	0.5	X	X	X	X	X
1,2-Dichloroethylene	0.3	X	X	0.4	X	X
Dichloromethane	0.2	X	X	X	0.2	0.2
1,2-Dichloropropane	0.5	X	X	X	X	X
cis-1,3-Dichloropropene	0.3	X	X	X	X	X
trans-1,3-Dichloropropene	1.0	X	X	X	X	X
Ethylbenzene	0.2	X	X	X	X	X
1,1,2,2-Tetrachloroethane	0.1	X	X	X	X	X
Tetrachloroethylene	0.1	X	0.2	0.1	X	X
Toluene	0.1	X	X	X	0.2	X
1,1,1-Trichloroethane	0.1	X	X	X	X	X
1,1,2-Trichloroethane	0.1	X	X	X	X	X
Trichloroethylene	0.1	X	X	X	X	X
Vinyl Chloride	2.0	X	X	X	X	X
Trichlorofluoromethane	0.2	X	X	X	X	X
Dichlorodifluoromethane	2.0	X	X	X	X	X
Zimpro Analytical No.		25298	25299	25300	25301	25302

X = Analyzed but not detected

All analyses have been conducted in accordance with the Zimpro Inc. Analytical Services Quality Assurance Program.

**ANALYTICAL REPORT**

WISCONSIN LAB CERTIFICATION NO. 737053130

FOR:

Foth & Van Dyke  
 2737 S. Ridge Rd.  
 P.O. Box 11997  
 Green Bay, WI 54307-1997

Attn: Mike Hastreiter

P.O. #: Silver Spring

SAMPLED BY: Client

DATE REC'D: 3-31-87

REPORT DATE: 4-27-87

APPROVED BY: M. C. L.

	Detection Limit	Seepage Pt.	Field Blank
Benzene	1.0	X	X
Bromoform	2.0	X	X
Bromomethane	4.0	X	X
Carbon Tetrachloride	0.5	X	X
Chlorobenzene	2.0	X	X
Chloroethane	2.0	X	X
2-Chloroethylvinyl Ether	5.0	X	X
Chloroform	0.5	X	X
Chloromethane	2.0	X	X
Dibromochloromethane	0.5	X	X
1,2-Dichlorobenzene	1.0	X	X
1,3-Dichlorobenzene	1.0	X	X
1,4-Dichlorobenzene	1.0	X	X
Dichlorobromomethane	0.5	X	X
1,1-Dichloroethane	0.5	X	X
1,2-Dichloroethane	0.5	X	X
1,1-Dichloroethylene	1.0	X	X
1,2-Dichloroethylene	1.0	X	X
Dichloromethane	1.0	X	X
1,2-Dichloropropane	0.5	X	X
cis-1,3-Dichloropropene	2.0	X	X
trans-1,3-Dichloropropene	0.5	X	X
Ethylbenzene	1.0	X	X
1,1,2,2-Tetrachloroethane	1.0	X	X
Tetrachloroethylene	0.5	X	X
Toluene	0.5	X	X
1,1,1-Trichloroethane	0.5	X	X
1,1,2-Trichloroethane	0.5	X	X
Trichloroethylene	0.5	X	X
Vinyl Chloride	2.0	X	X
Trichlorofluoromethane	1.0	X	X
Dichlorodifluoromethane	2.0	X	X

Zimpro Analytical No.

27145

27146

X = Analyzed but not detected

All analyses have been conducted in accordance with the Zimpro Inc. Analytical Services Quality Assurance Program.



## ANALYTICAL REPORT

WISCONSIN LAB CERTIFICATION NO. 737053130

FOR:

Foth & Van Dyke  
2737 S. Ridge Road  
P.O. Box 11997  
Green Bay, WI 54307-1997

Attn: Dave Turriff

P.O. #: 5748

SAMPLED BY: Client

DATE REC'D: 7-31-87

REPORT DATE: 8-28-87

APPROVED BY: KSF

### VOC Analysis (ug/l)

	Detection Limit	Upstream	Downstream
1,2-Dichloroethylene	1.0	X	X
Tetrachloroethylene	0.5	X	X
Analytical No.		31055	31056

X = Analyzed but not detected

All analyses have been conducted in accordance with the Zimpro Inc. Analytical Services Quality Assurance Program.



ENVIRONMENTAL & ENERGY SYSTEMS  
ROTHSCHILD, WISCONSIN 54474  
PH. 715 / 359-7211 TELEEX 29-0495

## ANALYTICAL REPORT

WISCONSIN LAB CERTIFICATION NO. 737053130

FOR:

Foth & Van Dyke  
2737 S. Ridge Road  
P.O. Box 11997  
Green Bay, WI 54307-1997

Attn: Dave Turriff

P.O. #: 5748

SAMPLED BY: Client

DATE REC'D: 7-31-87

REPORT DATE: 8-28-87

APPROVED BY: KSF

### VOC Analysis (ug/l)

	<u>Detection Limit</u>	<u>OW-108B</u>
Tetrachloroethylene	0.5	X
Analytical No.		31054

X = Analyzed but not detected

B-9 Elevation 682.73'

0'-1' Dark brown LEAN CLAY, with  
sand (CL)  
1'-5' Light brown SILT, with sand (SM)  
(moist, odor)

EOB 5'

B-9 0'-1'  
(CL)

LL = 46.3

PI = 24.2

% P200 = 81.2

% clay (0.002 mm) = 28.0

B-10 Elevation 680.70'

0'-1' Dark brown CLAY, with silt (CL)  
1'-3' Light brown SILT, with fine sand,  
trace gravel (SM)  
3'-5' Light brown SAND, some gravel, trace silt (SP-SM)

EOB 5'

B-11 Elevation 685.09'

0'-1' Dark brown CLAY, with silt (CL)  
1'-3' Dark brown CLAY, trace silt (CL)  
3'-5' Brown SILT, with sand, trace clay (SM)

EOB 5'

B-12 Elevation 688.14'

0'-1' Dark brown CLAY, with silt and sand (ML-CL)  
1'-5' REFUSE

EOB 5'



## ANALYTICAL REPORT

WISCONSIN LAB CERTIFICATION NO. 7326330

FOR:

Foth & Van Dyke  
2737 S. Ridge Road  
P.O. Box 11997  
Green Bay, WI 54307-1997

Attn: Dave Turriff

P.O. # 5748

SAMPLED BY: Client

DATE RECD: 7-31-87

REPORT DATE: 8-28-87

APPROVED BY: KSF

### VOC Analysis (ug/l)

	<u>Detection Limit</u>	<u>P-101A</u>	<u>P-105A</u>
Vinyl Chloride	2.0	304.	19.1
Analytical No.		31049	31051

All analyses have been conducted in accordance with the Zimpro Inc. Analytical Services Quality Assurance Program.



**ZIMPRO**ENVIRONMENTAL & ENERGY SYSTEMS  
ROTHSCHILD, WISCONSIN 54474  
PH 715/353-7211 TELEX 29-0495**ANALYTICAL REPORT**

WISCONSIN LAB CERTIFICATION NO. 737053130

FOR:

Foth & Van Dyke  
2737 S. Ridge Road  
P.O. Box 11997  
Green Bay, WI 54307-1997

Attn: Dave Turriff

P.O. #: 5748

SAMPLED BY: Client

DATE REC'D: 7-31-87

REPORT DATE: 8-28-87

APPROVED BY: KSF

## VOC Analysis (ug/l)

	<u>Detection Limit</u>	<u>Field Blank</u>
1,2-Dichloroethylene	1.0	X
Tetrachloroethylene	0.5	X
Vinyl Chloride	2.0	X
Analytical No.		31057

X = Analyzed but not detected

All analyses have been conducted in accordance with the Zimpro Inc. Analytical Services Quality Assurance Program.

APPENDIX C

Drawing No. C-2, 2 of 2  
Topographic and Boring Location Map

APPENDIX D  
Cap Boring Logs

LANDFILL SAMPLING AND ANALYSIS;  
USARC, West Silver Spring Drive, Milwaukee, Wisconsin

Auger Borings drilled on February 24 and 25, 1987

B-1      Elevation 685.20'

0'-5' Brown LEAN CLAY, with silt and gravel trace sand  
(CL) (no refuse)

EOB 5'

B-2      Elevation 685.40'

0'-2' Brown LEAN CLAY, trace sand and gravel (CL)  
2'-5' REFUSE

EOB 5'

B-3      Elevation 683.90'

0'-1' Dark gray brown SAND,  
medium to fine, some silt (SM)  
(some glass and clinker)  
1'-5' REFUSE (wet @ 2')

EOB 5'

B-3 0.5'

(SM)

% P200 = 30.0

% clay (0.002 mm) = 5.5

B-4      Elevation 683.22'

0'-0.5' Dark gray brown CLAY, with sand (SC)  
0.5'-5' REFUSE (wet)

EOB 5'

B-5 Elevation 684.05'

0'-2' Brown CLAY, with silt, trace gravel (CL-ML)

2'-5' Brown SILT, with sand and trace refuse

EOB 5'

B-6 Elevation 681.47'

0'-3' Yellow brown LEAN CLAY, with sand (CL)

3'-5' Brown to light brown SAND, fine to coarse,  
with silt, trace refuse

EOB 5'

B-6 1'-2'

(CL)

LL = 27.0

PI = 12.3

% P200 = 77.0

% clay (0.002 mm) = 23.5

B-7 Elevation 678.55'

0'-2' Dark grey brown CLAY, with silt (CL-ML)

2'-5' Light brown to brown SAND, fine to medium  
trace refuse (wet, with slight odor)

EOB 5'

B-8 Elevation 681.80'

0'-1' Dark grey brown LEAN CLAY, with silt  
trace gravel (CL-ML)

1'-5' Light brown SILT, with fine sand  
and refuse (odor)

EOB 5'

B-9 Elevation 682.73'

0'-1' Dark brown LEAN CLAY, with  
sand (CL)

1'-5' Light brown SILT, with sand (SM)  
(moist, odor)

EOB 5'

B-9 0'-1'  
(CL)

LL = 46.3

PI = 24.2

% P200 = 81.2

% clay (0.002 mm) = 28.0

B-10 Elevation 680.70'

0'-1' Dark brown CLAY, with silt (CL)

1'-3' Light brown SILT, with fine sand,  
trace gravel (SM)

3'-5' Light brown SAND, some gravel, trace silt (SP-SM)

EOB 5'

B-11 Elevation 685.09'

0'-1' Dark brown CLAY, with silt (CL)

1'-3' Dark brown CLAY, trace silt (CL)

3'-5' Brown SILT, with sand, trace clay (SM)

EOB 5'

B-12 Elevation 688.14'

0'-1' Dark brown CLAY, with silt and sand (ML-CL)

1'-5' REFUSE

EOB 5'

B-13 Elevation 687.60'

0'-2' Dark brown LEAN CLAY, with sand, trace gravel (CL)  
2'-5' REFUSE

EOB 5'

B-13 1.5'  
(CL)  
LL = 41.2  
PI = 19.7  
% P200 = 73.9  
% clay (0.002 mm) = 26.0

B-14 Elevation 687.79'

0'-1' Brown to light brown SILT, with sand (SM)  
1'-5' REFUSE

EOB 5'

B-15 Elevation 686.54'

0'-1' Dark brown to black CLAY, with sand and gravel  
(SC)  
1'-5' REFUSE

EOB 5'

B-16 Elevation 687.03'

0'-1' Dark brown LEAN CLAY, with sand (CL)  
1'-5' REFUSE

EOB 5'

B-16 0.5'  
(CL)  
LL = 49.3  
PI = 25.0  
% P200 = 78.2  
% clay (0.002 mm) = 25.0

B-17 Elevation 687.76'

0'-0.3' Black cinders  
0.3'-5' REFUSE

EOB 5'

B-18 Elevation 688.95'

0'-0.5' Black cinders  
0.3'-5' REFUSE

EOB 5'

B-19 Elevation 690.54'

0'-0.25' Black SAND and CLAY, with refuse (SC)  
0.25'-5' REFUSE

EOB 5'

B-20 Elevation 689.27'

0'-0.5' Brown LEAN CLAY, with sand and silt (CL)  
0.5'-0' REFUSE

EOB 5'

B-21 Elevation 687.46'

0'-1.5' Brown to dark LEAN CLAY, with sand (CL)  
1.5'-5' REFUSE

EOB 5'

B-21 1.5'  
(CL)

LL = 34.7

PI = 18.2

% P200 = 75.2

% clay (0.002 mm) = 25.5

B-22 Elevation 685.01'

0'-1.5' Dark brown CLAY, with sand (SC)  
1.5'-5' REFUSE

EOB 5'



B-23 Elevation 687.09'

0'-2' Brown SAND, with clay and gravel (SC/SC-SM)  
2'-5' REFUSE

EOB 5'

B-23 1'-2'  
(SC/SC-SM)  
LL = 24.3  
PI = 8.7  
% P200 = 39.2  
% clay (0.002 mm) = 8.5

B-24 Elevation 688.69'

0'-2' Brown LEAN CLAY, with gravel and sand (CL)  
2'-5' REFUSE

EOB 5'

B-25 Elevation 689.75'

0'-0.25' Brown LEAN CLAY (CL)  
0.25'-5' REFUSE

EOB 5'

B-26 Elevation 693.92'

0'-2' Brown LEAN CLAY, with sand (CL)  
2'-5' REFUSE

EOB 5'

B-26 1'  
(CL)  
LL = 34.7  
PI = 18.2  
% P200 = 79.2  
% clay (0.002 mm) = 29.5

B-27 Elevation 689.91'

0'-2.5' Brown LEAN CLAY, with sand (CL)  
2.5'-5' REFUSE

EOB 5'

B-27 1'  
(CL)  
LL = 34.7  
PI = 18.2  
% P200 = 79.2  
% clay (0.002 mm) = 29.5

B-28 Elevation 687.34'

0'-0.25' Black cinders, mixed with clay  
0.25'-5' REFUSE

EOB 5'

B-29 Elevation 681.68'

0'-2' Brown CLAY, with silt (CL-ML)  
2'-5' Light brown SILT, with clay, trace gravel (ML)  
(no refuse)

EOB 5'

B-30 Elevation 688.3'

0'-0.5' Dark brown LEAN CLAY, with sand (CL)  
0.5'-5' REFUSE

EOB 5'

B-30 0.5'  
(CL)  
LL = 31.8  
PI = 15.5  
% P200 = 76.9  
% clay (0.002 mm) = 23.5

B-31 Elevation 691.71'

0'-0.5' Brown SAND, with gravel (SP)  
0.5'-5' REFUSE

EOB 5'

B-32      Elevation 690.65'  
0'-5' Brown LEAN CLAY, with gravel, trace sand (CL)  
EOB 5'

B-33      Elevation 688.66'  
0'-0.5' Brown SAND, with gravel (SP)  
0.5'-5' REFUSE  
EOB 5'

B-34      Elevation 688.28'  
0'-0.5' Brown sandy LEAN CLAY (CL)  
0.5'-5' REFUSE  
EOB 5'

B-34 Surface  
(CL)  
LL = 30.6  
PI = 13.9  
% P200 = 64.4  
% clay (0.002 mm) = 20.5

B-35      Elevation 686.15'  
0'-0.5' Brown SAND, with gravel (SP)  
0.5'-5' REFUSE  
EOB 5'

B-36      Elevation 684.46'  
0'-0.5' Brown CLAY, with sand (SC)  
0.5'-5' REFUSE  
EOB 5'

B-37 Elevation 682.88'

0'-0.25' Brown LEAN CLAY, with sand (SC)  
0.25'-5' REFUSE

EOB 5'

B-38 Elevation 686.19'

0'-0.25' Brown LEAN CLAY, with sand (CL)  
0.25'-5' REFUSE

EOB 5'

B-38 Surface  
(CL)  
LL = 35.19  
PI = 17.0  
% P200 = 75.1  
% clay (0.002 mm) = 24.0

B-39 Elevation 682.88'

0'-0.25' Brown LEAN CLAY, with gravel (CL)  
0.25'-5' REFUSE

EOB 5'

B-40 Elevation 680.99'

0'-0.5' Dark gray brown SAND, fine-medium, with clay  
and gravel (SC)  
0.5'-5' REFUSE

EOB 5'

B-40 Surface  
(SC)  
LL = 33.6  
PI = 14.3  
% P200 = 35.7  
% clay (0.002 mm) = 7.0

B-41 Elevation 684.01'

0'-1.5' Dark brown LEAN CLAY, with sand (CL)  
1.5'-5' REFUSE

EOB 5'

B-41 1'  
(CL)  
LL = 36.3  
PI = 19.6  
% P200 = 68.3  
% clay (0.002 mm) = 28.7

B-42 Elevation 688.96'

0'-1.5' Brown LEAN CLAY, with sand (CL)  
1.5'-3' Dark brown LEAN CLAY, with gravel (CL)  
3'-5' Light brown to brown CLAY, with silt (CL-ML)  
(no refuse)

EOB 5'

B-43 Elevation 689.09'

0'-2' Brown LEAN CLAY, with gravel (CL)  
2'-3.5' Dark brown LEAN CLAY, with gravel (CL)  
3.5'-5' Light brown SILT, some clay (ML)  
(no refuse)

EOB 5'

B-44 Elevation 682.12'

0'-3' Brown LEAN CLAY, with gravel (CL)  
3'-5' Dark brown LEAN CLAY (CL)  
(no refuse)

EOB 5'

B-45      Elevation 686.48'

0'-0.25' Dark brown LEAN CLAY, with sand (CL)  
0.25'-5' REFUSE (hard drilling)

EOB 5'

B-45 Surface  
(CL)

LL = 28.8

PI = 13.8

% P200 = 69.1

% clay (0.002 mm) = 17.0

B-46      Elevation 690.06'

0'-5' REFUSE

EOB 5'

B-47      Elevation 690.12'

0'-0.16' Dark brown LEAN CLAY, with sand (CL)  
0.16'-5' REFUSE

EOB 5'

B-47 Surface  
(CL)

LL = 32.1

PI = 13.1

% P200 = 53.5

% clay (0.002 mm) = 11.5

B-48      Elevation 693.45'

0'-5' REFUSE (appears to be cinders on surface)

EOB 5'

B-49      Elevation 692.11'

0'-5' REFUSE (appears to be cinders on surface)

EOB 5'

B-50 Elevation 688.89'

0'-5' REFUSE

EOB 5'

B-51 Elevation 687.72'

0'-1' Dark brown FAT CLAY, with sand (CH/MH)

1'-5' REFUSE (mixed with sand and clay)

EOB 5'

B-51 Surface  
(CH/MH)

LL = 54.8

PI = 26.5

% P200 = 80.9

% clay (0.002 mm) = 29.0

B-52 Elevation 691.08

0'-0.5' Dark brown LEAN CLAY, with sand (CL)

0.5'-5' REFUSE

EOB 5'

B-52 0'-5'  
(CL)

LL = 49.6

PI = 25.7

% P200 = 87.7

% clay (0.002 mm) = 48.0

B-53 Elevation 693.17'

0'-5' REFUSE (appears to be cinders on surface)

EOB 5'

B-54 Elevation 694.30'

0'-0.5' Brown LEAN CLAY, with sand (CL)

0.5'-5' REFUSE

EOB 5'

B-54 Surface  
(CL)

LL = 26.0

PI = 11.8

% P200 = 70.2

% clay (0.002 mm) = 21.5

B-55      Elevation 694.14'

0'-0.5' Dark brown LEAN CLAY, with sand (CL)  
0.5'-5' REFUSE

EOB 5'

B-56      Elevation 692.72'

0'-1.5' Dark brown LEAN CLAY, with sand (CL)  
1.5'-5' REFUSE

EOB 5'

B-56 1.5'

(CL)

LL = 41.0

PI = 20.1

% P200 = 76

% clay (0.002 mm) = 30.5

B-57      Elevation 693.23'

0'-3' Brown LEAN CLAY, with sand (CL)  
3'-5' REFUSE

EOB 5'

B-58      Elevation 692.24'

0'-1.5' Dark brown LEAN CLAY, with sand (CL/ML)  
1.5'-5' REFUSE

EOB 5'

B-58 Surface

(CL/ML)

LL = 43.3

PI = 18.3

% P200 = 65.6

% clay (0.002 mm) = 22.5

B-59      Elevation 691.65'

0'-2' Brown LEAN CLAY, with sand (CL)  
2'-5' REFUSE

EOB 5'



B-60      Elevation 690.16'

0'-2' Brown to dark brown SILT, little sand (MH/CH)  
2'-5' REFUSE

EOB 5'

B-60 2'  
(MH/CH)  
LL = 65.1  
PI = 30.1  
% P200 = 84.8  
% clay (0.002 mm) = 29.0

B-61      Elevation 687.69'

0'-3' Dark brown to brown LEAN CLAY (CL)  
3'-5' REFUSE

EOB 5'

B-62      Elevation 687.39'

0'-0.5' Dark brown LEAN CLAY, with sand (CL)  
0.5'-5' REFUSE

EOB 5'

B-62 0.5'  
(CL)  
LL = 37.6  
PI = 16.3  
% P200 = 60.4  
% clay (0.002 mm) = 18.5

B-63      Elevation 691.02'

0'-0.25' Dark brown LEAN CLAY, with sand (CL)  
0.25'-5' REFUSE

EOB 5'

B-64      Elevation 691.55'

0'-2' Dark brown to light brown LEAN CLAY,  
with sand (CL)  
2'-5' REFUSE

EOB 5'

B-64 2'  
(CL)  
LL = 27.4  
PI = 12.0  
% P200 = 76.4  
% clay (0.002 mm) = 22.5

B-65      Elevation 690.19'

0'-1.5' Dark brown LEAN CLAY, with sand (CL/ML)  
1.5'-5' REFUSE

EOB 5'

B-65 1'  
(CL/ML)  
LL = 37.4  
PI = 16.3  
% P200 = 73.4  
% clay (0.002 mm) = 24.5

B-66      Elevation 688.17'

0'-0.5' Brown LEAN CLAY, with sand (CL)  
0.5'-5' REFUSE

EOB 5'

B-66 0.5'  
(CL)  
LL = 30.6  
PI = 13.6  
% P200 = 74.1  
% clay (0.002 mm) = 22.0

B-67      Elevation 690.3'

0'-0.5' Brown LEAN CLAY, with sand (CL)  
0.5'-5' REFUSE

EOB 5'

APPENDIX E  
Soil Testing Results

# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road

P. O. Box 19012

Green Bay, Wisconsin 54307-9012

414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86M94

DATE: March 20-23, 1987

REPORT NO.: 1

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Speci- fications
3-Inch				
2-Inch				
1 1/2-Inch				
1-Inch				
3/4-Inch				
1/2-Inch	0	0	100	
3/8-Inch	5.1	3.0	97.0	
No. 4	15.5	9.2	87.8	
No. 8				
No. 10	20.6	12.3	75.5	
No. 16				
No. 20				
No. 30				
No. 40	40.7	24.3	51.2	
No. 50				
No. 80				
No. 100	24.3	14.5	36.7	
No. 200	11.2	6.7	30.0	
Pan <sup>49.3</sup> 1.0	50.3	30.0		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 167.7 grams

SUBMITTED BY: Janis Kesv of F&VD

SAMPLED FROM: Boring B-3

IDENTIFICATION: Depth 0.5'

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

PERCENT PASSING NO. 200 SIEVE 30.0 %

COLOR: 2.5 Y 3/2 - Very dark grayish brown

REMARKS: Glass and Clinker make up 10-12% of the total sample.

CHECKED BY: \_\_\_\_\_



# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86M94

DATE: March 20-23, 1987

REPORT NO.: 2

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Speci- fications
3-Inch				
2-Inch				
1 1/2-Inch				
1-Inch				
3/4-Inch				
1/2-Inch				
3/8-Inch	0	0	100	
No. 4	5.9	2.7	97.3	
No. 8				
No. 10	9.5	4.3	93.0	
No. 16				
No. 20				
No. 30				
No. 40	12.2	5.5	87.5	
No. 50				
No. 80				
No. 100	13.3	6.0	81.5	
No. 200	9.8	4.5	77.0	
169.1 Pan .2	169.3	77.0		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 220.0 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-6

IDENTIFICATION: Depth 1'-2'

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

PERCENT PASSING NO. 200 SIEVE 77.0 %

COLOR: 10 YR. 5/4 - Yellowish brown

CHECKED BY: \_\_\_\_\_



# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86M94

DATE: March 20-23, 1987

REPORT NO.: 3

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Speci- fications
3-Inch				
2-Inch				
1 1/2-Inch				
1-Inch				
3/4-Inch				
1/2-Inch	0	0	100	
3/8-Inch	8.5	3.1	96.9	
No. 4	1.0	.4	96.5	
No. 8				
No. 10	1.6	.6	95.9	
No. 16				
No. 20				
No. 30				
No. 40	6.7	2.4	93.5	
No. 50				
No. 80				
No. 100	23.3	8.4	85.1	
No. 200	11.1	4.0	81.1	
225.4 Pan .3	225.7	81.2		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 277.9 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-9

IDENTIFICATION: Depth 1'

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

PERCENT PASSING NO. 200 SIEVE 81.2 %

COLOR: 10 YR. 3/4 - Dark brown

CHECKED BY: \_\_\_\_\_





# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86M94

DATE: March 20-23, 1987

REPORT NO.: 4

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Specifi-cations
3-Inch				
2-Inch				
1 1/2-Inch				
1-Inch				
3/4-Inch	0	0	100	
1/2-Inch	4.3	1.7	98.3	
3/8-Inch	3.2	1.3	97.0	
No. 4	2.2	.9	96.1	
No. 8				
No. 10	3.5	1.4	94.7	
No. 16				
No. 20				
No. 30				
No. 40	11.0	4.4	90.3	
No. 50				
No. 80				
No. 100	28.1	11.2	79.1	
No. 200	13.2	5.2	73.9	
186.2 Pan	186.3	74.0		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 251.7 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-13

IDENTIFICATION: Depth 1.5'

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

PERCENT PASSING NO. 200 SIEVE 73.9 %

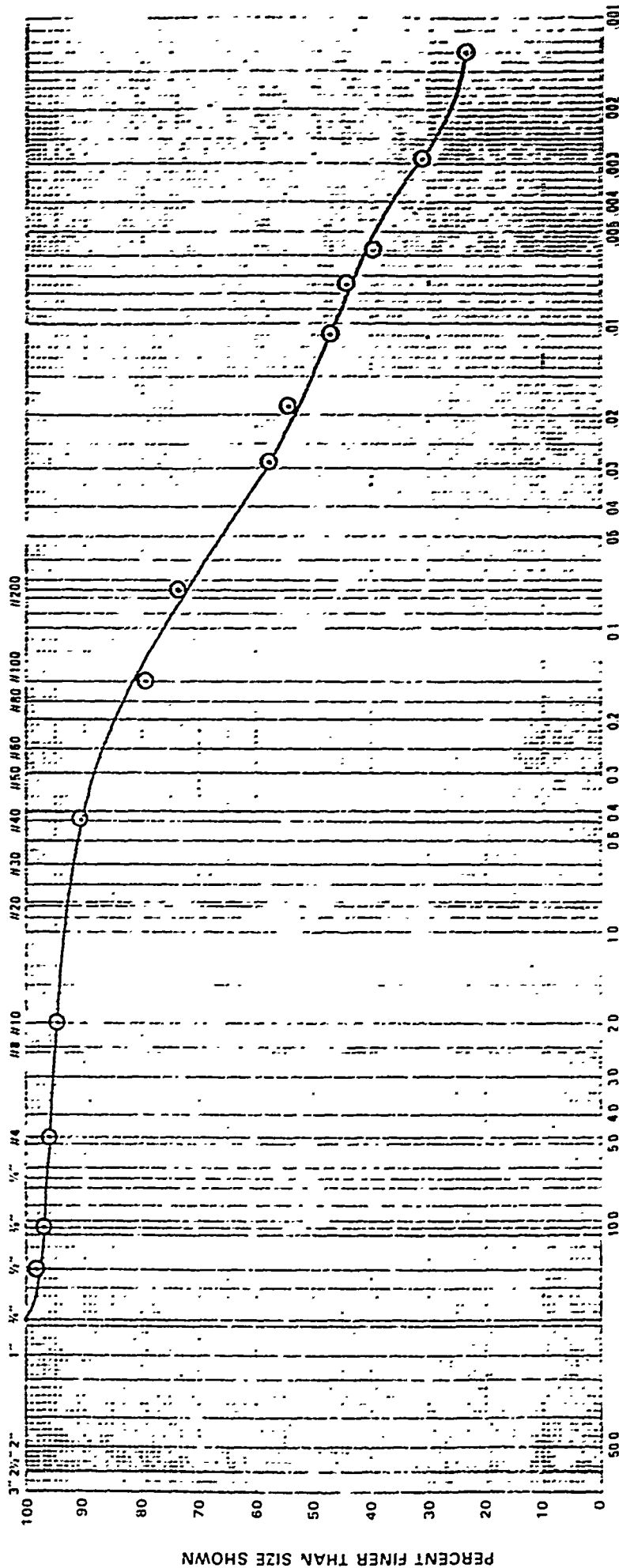
COLOR: 10 YR. 3/3 - Dark brown

CHECKED BY: \_\_\_\_\_

Foth & Van Dyke and Associates Inc.

## GRAIN SIZE DISTRIBUTION CURVE

U.S. STANDARD SIEVE SIZES



GRAVEL		SAND		SILT		CLAY	
COARSE	FINE	COARSE	MEDIUM	FINE			
% =	3.9	% = 1.4	% = 4.4	% = 16.4	% = 47.9	% = 26.0	

PROJECT USARC Silver Spring Landfill

DATE 3/25/87

SAMPLE NO. 4

LOCATION SAMPLED Boring B-13

ELEV OR DEPTH 1.5'

DRAWN BY POK

APPROVED BY RLR

ATTEBERG LIMITS LL 41.2 PL 21.5 PI 19.7

SAMPLED MOISTURE CONTENT (%)

COEFFICIENTS: Co =

Cu =

SAMPLE SOURCE USARC Silver Spring Drive

MUNZELL COLOR CODE 10 YR. 3/3

DATE SAMPLED February, 1987

SOIL CLASSIFICATION (ASTM: D2487) LEAN CLAY W/SAND, dark brown (CL)

FORM #411 SL (2/87)

# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86M94

DATE: March 20 to 24, 1987

REPORT NO.: 5

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Speci- fications
3-Inch				
2-Inch				
1½-Inch				
1-Inch				
¾-Inch				
½-Inch				
⅜-Inch	0	0	100	
No. 4	4.6	2.7	97.3	
No. 8				
No. 10	6.2	3.7	93.6	
No. 16				
No. 20				
No. 30				
No. 40	10.0	5.9	87.7	
No. 50				
No. 80				
No. 100	11.1	6.5	81.2	
No. 200	5.1	3.0	78.2	
132.3 Pan	132.5	78.2		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 169.5 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-16

IDENTIFICATION: Depth 0.5'

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

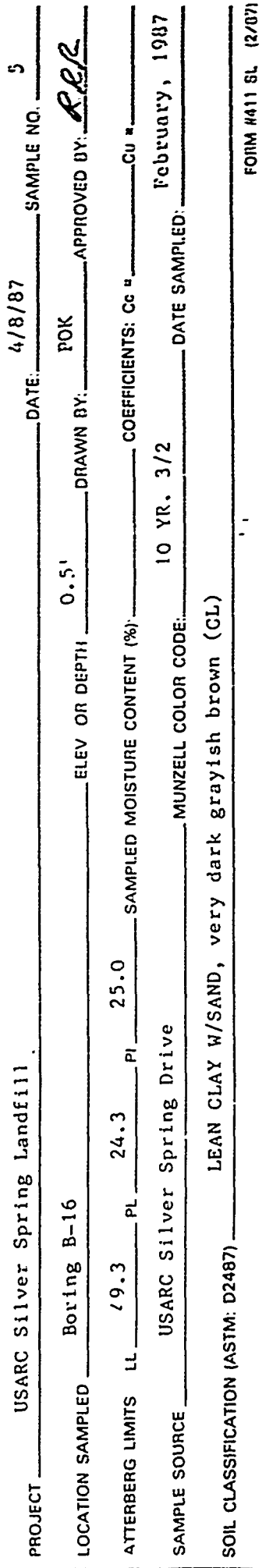
PERCENT PASSING NO. 200 SIEVE 78.2 %

COLOR: 10 YR. 3/2 - Very dark grayish brown

NOTE: Small pieces of glass found in this sample.

CHECKED BY: \_\_\_\_\_

## GRAIN SIZE DISTRIBUTION CURVE



# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86M94

DATE: March 20 to 24, 1987

REPORT NO.: 6

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Speci- fications
3-Inch				
2-Inch				
1½-Inch				
1-Inch				
¾-Inch				
½-Inch	0	0	100	
⅜-Inch	1.6	.8	99.2	
No. 4	3.5	1.7	97.5	
No. 8				
No. 10	6.5	3.1	94.4	
No. 16				
No. 20				
No. 30				
No. 40	14.7	7.0	87.4	
No. 50				
No. 80				
No. 100	17.4	8.3	79.1	
No. 200	8.3	4.0	75.1	
157.6 Pan 4	158.0	75.2		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 210.0 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-21

IDENTIFICATION: Depth 1.5'

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

PERCENT PASSING NO. 200 SIEVE 75.2 %

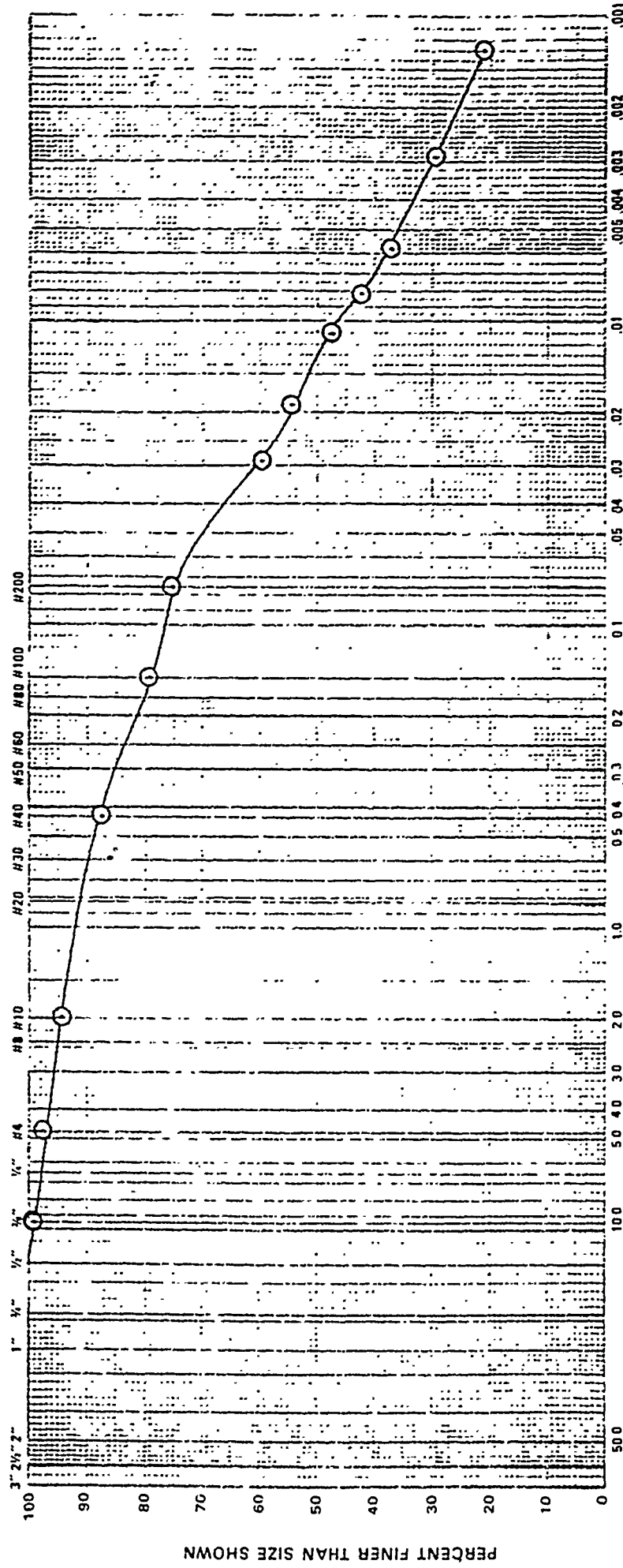
COLOR: 10 YR. 4/3 - Brown to dark brown

CHECKED BY: \_\_\_\_\_

Foth & Van Dyke and Associates Inc.

# GRAIN SIZE DISTRIBUTION CURVE

U.S. STANDARD SIEVE SIZES



PARTICLE SIZE IN MILLIMETERS

GRAVEL		SAND		SILT		CLAY	
COARSE	FINE	COARSE	MEDIUM	FINE			
% =	% =	% =	% =	% =	% =	% =	% =
	2.5	3.1	7.0	12.2	49.7		25.5

PROJECT USARC Silver Spring Landfill

DATE 4/8/87 SAMPLE NO 6

LOCATION SAMPLED Boring B-21

ELEV OR DEPTH 1.5' DRAWN BY: POK APPROVED BY: RRR

ATTERBERG LIMITS LL 34.7 PL 16.5 PI 18.2 SAMPLED MOISTURE CONTENT (%) COEFFICIENTS: Cc = Cu =

SAMPLE SOURCE USARC Silver Spring Drive MUNZELL COLOR CODE 10 YR. 4/3 DATE SAMPLED: February, 1987

SOIL CLASSIFICATION (ASTM: D2487) LEAN CLAY W/SAND, brown to dark brown (CL)

# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86M94

DATE: March 20 to 23, 1987

REPORT NO.: 7

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Specifi- cations
3-Inch				
2-Inch				
1 1/2-Inch				
1-Inch				
3/4-Inch	0	0	100	
1/2-Inch	37.7	12.8	87.2	
3/8-Inch	15.0	5.1	82.1	
No. 4	23.3	7.9	74.2	
No. 8				
No. 10	20.6	7.0	67.2	
No. 16				
No. 20				
No. 30				
No. 40	34.8	11.9	55.3	
No. 50				
No. 80				
No. 100	32.3	11.0	44.3	
No. 200	14.7	5.0	39.3	
114.0 Pan 1.0	115.0	39.2		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 293.4 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-23

IDENTIFICATION: Depth 1'-2'

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

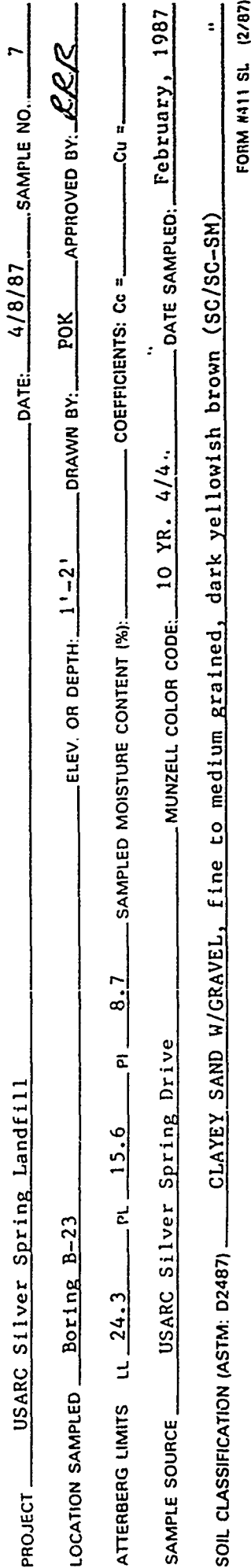
PERCENT PASSING NO. 200 SIEVE 39.2 %

COLOR: 10 YR. 4/4 - Dark yellowish brown

CHECKED BY: \_\_\_\_\_



## GRAIN SIZE DISTRIBUTION CURVE



# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86M94

DATE: March 20 to 24, 1987

REPORT NO.: 8

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Specifi-cations
3-Inch				
2-Inch				
1 1/2-Inch				
1-Inch				
3/4-Inch				
1/2-Inch				
3/8-Inch	0	0	100	
No. 4	5.2	2.2	97.8	
No. 8				
No. 10	5.8	2.4	95.4	
No. 16				
No. 20				
No. 30				
No. 40	13.0	5.4	90.0	
No. 50				
No. 80				
No. 100	17.0	7.1	82.9	
No. 200	8.7	3.6	79.3	
Pan <sup>189.0</sup> 189.4	189.4	79.2		
Fineness Modulus				

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 239.1 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-26

IDENTIFICATION: Depth 1'

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

PERCENT PASSING NO. 200 SIEVE 79.2 %

10 YR. 4/3 - Brown to dark brown

CHECKED BY: \_\_\_\_\_



# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86M94

DATE: March 20 to 27, 1987

REPORT NO.: 9

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Speci- fications
3-Inch				
2-Inch				
1 1/2-Inch				
1-Inch				
3/4-Inch				
1/2-Inch	0	0	100	
3/8-Inch	1.7	1.2	98.8	
No. 4	3.7	2.6	96.2	
No. 8				
No. 10	3.0	2.1	94.1	
No. 16				
No. 20				
No. 30				
No. 40	6.8	4.7	89.4	
No. 50				
No. 80				
No. 100	9.3	6.4	83.0	
No. 200	8.8	6.1	76.9	
Pan <sup>110.7</sup> <sub>2</sub>	110.9	76.9		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 144.2 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-30

IDENTIFICATION: Depth 0.5'

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

PERCENT PASSING NO. 200 SIEVE 76.9 %

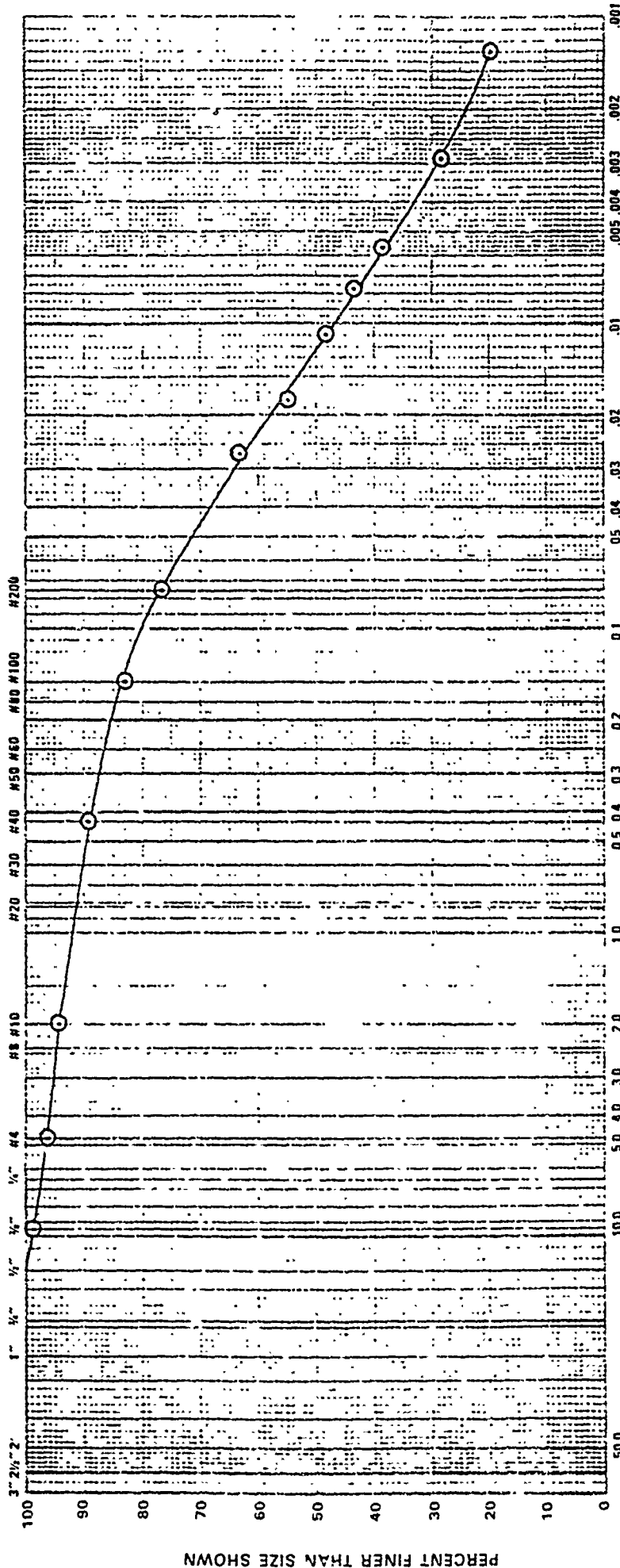
COLOR: 10 YR. 4/4 - Dark yellowish brown

CHECKED BY: \_\_\_\_\_

Foth & Van Dyke and Associates Inc.

## GRAIN SIZE DISTRIBUTION CURVE

U.S. STANDARD SIEVE SIZES



GRAVEL				SAND				SILT		CLAY	
COARSE		FINE		COARSE		MEDIUM		FINE			
% =		3.8		% = 2.1		% = 4.7		% = 12.5		% = 53.4	
										% = 23.5	

PROJECT USARC Silver Spring Landfill

DATE 4/8/87 SAMPLE NO. 9

LOCATION SAMPLED Boring B-30

ELEV OR DEPTH 0.5'

DRAWN BY: POK

APPROVED BY: RRR

ATTERBERG LIMITS LL 31.8 PL 16.3 PI 15.5 SAMPLED MOISTURE CONTENT (%)            COEFFICIENTS: Cc =            Cu =           

SAMPLE SOURCE USARC Silver Spring Drive

MUNZELL COLOR CODE: 10 YR. 4/4

DATE SAMPLED: February, 1987

SOIL CLASSIFICATION (ASTM. D2487) LEAN CLAY W/SAND, dark reddish brown (CL)

# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86M94

DATE: March 20 to 27, 1987

REPORT NO.: 10

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Speci- fications
3-Inch				
2-Inch				
1 1/2-Inch				
1-Inch				
3/4-Inch				
1/2-Inch				
3/8-Inch	0	0	100	
No. 4	3.8	4.5	95.5	
No. 8				
No. 10	5.0	6.0	89.5	
No. 16				
No. 20				
No. 30				
No. 40	8.9	10.6	78.9	
No. 50				
No. 80				
No. 100	8.4	10.0	68.9	
No. 200	3.7	4.4	64.5	
Pan 53.5	53.8	64.4		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 83.6 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-34

IDENTIFICATION: Depth: Surface

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

PERCENT PASSING NO. 200 SIEVE 64.4 %

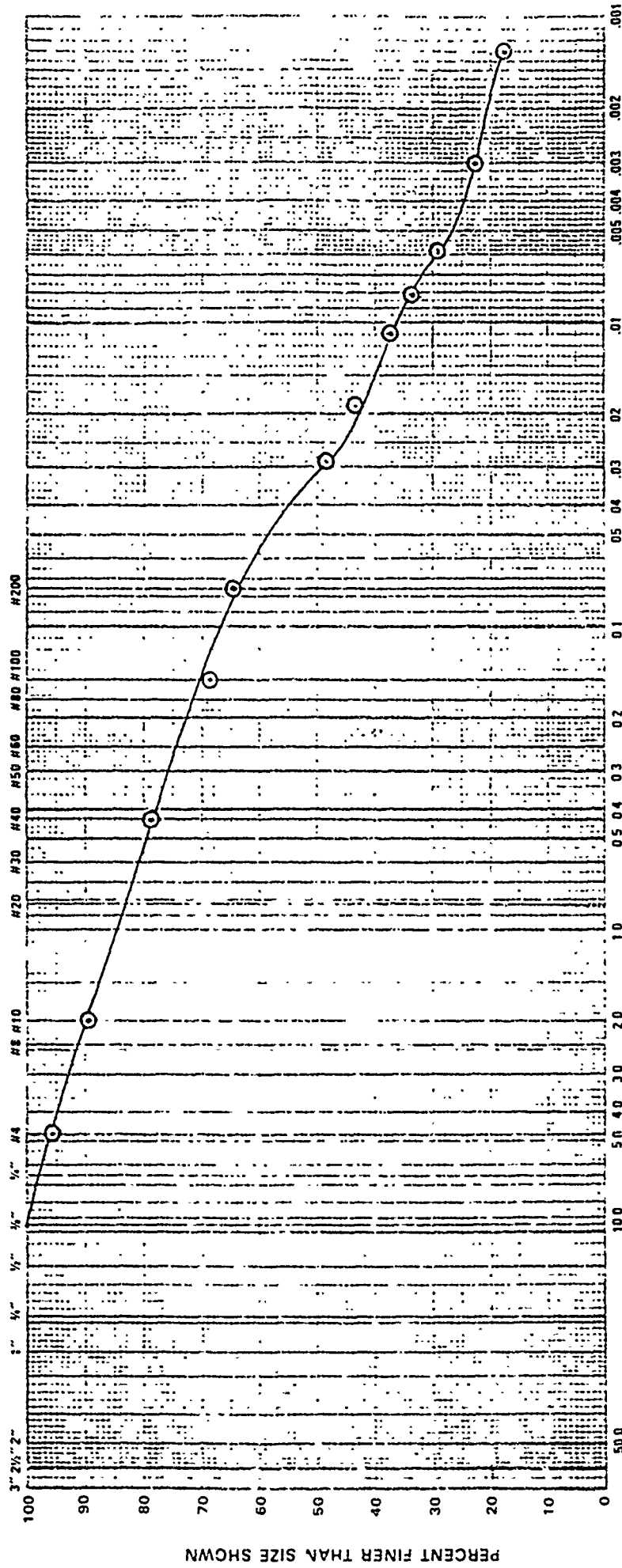
COLOR: 10 YR. 4/3 - Brown to dark brown

CHECKED BY: \_\_\_\_\_

Foth & Van Dyke and Associates Inc.

## GRAIN SIZE DISTRIBUTION CURVE

U.S. STANDARD SIEVE SIZES



GRAVEL		SAND		SILT		CLAY	
COARSE	FINE	COARSE	MEDIUM	FINE			
% =	4.5	% = 6.0	% = 10.6	% = 14.5	% = 43.9	% = 20.5	

PROJECT USARC Silver Spring Landfill DATE: 4/8/87 SAMPLE NO.: 10

LOCATION SAMPLED Boring B-34 ELEV OR DEPTH Surface DRAWN BY: POK APPROVED BY: RRR

ATTERBERG LIMITS LL 30.6 PI 16.7 PI 13.9 SAMPLED MOISTURE CONTENT (%) Cc = Cu =

SAMPLE SOURCE USARC Silver Spring Drive MUNZELL COLOR CODE: 10 YR. 4/3 DATE SAMPLED: February, 1987

SOIL CLASSIFICATION (ASTM: D2487) SANDY LEAN CLAY, brown to dark brown (CL)

FORM #411 SL (2/87)

# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86M94

DATE: March 20 to 27, 1987

REPORT NO.: 11

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Specifi-cations
3-Inch				
2-Inch				
1 1/2-Inch				
1-Inch				
3/4-Inch				
1/2-Inch	0	0	100	
3/8-Inch	1.5	1.1	98.9	
No. 4	3.0	2.1	96.8	
No. 8				
No. 10	5.0	3.6	93.2	
No. 16				
No. 20				
No. 30				
No. 40	10.2	7.3	85.9	
No. 50				
No. 80				
No. 100	9.3	6.6	79.3	
No. 200	4.5	3.2	76.1	
106.6 Pan	106.7	76.1		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 140.2 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-38

IDENTIFICATION: Depth: Surface

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

PERCENT PASSING NO. 200 SIEVE 76.1 %

COLOR: 10 YR. 2/2 - Very dark brown

NOTE: Small amounts of asphalt and glass were found in this sample.

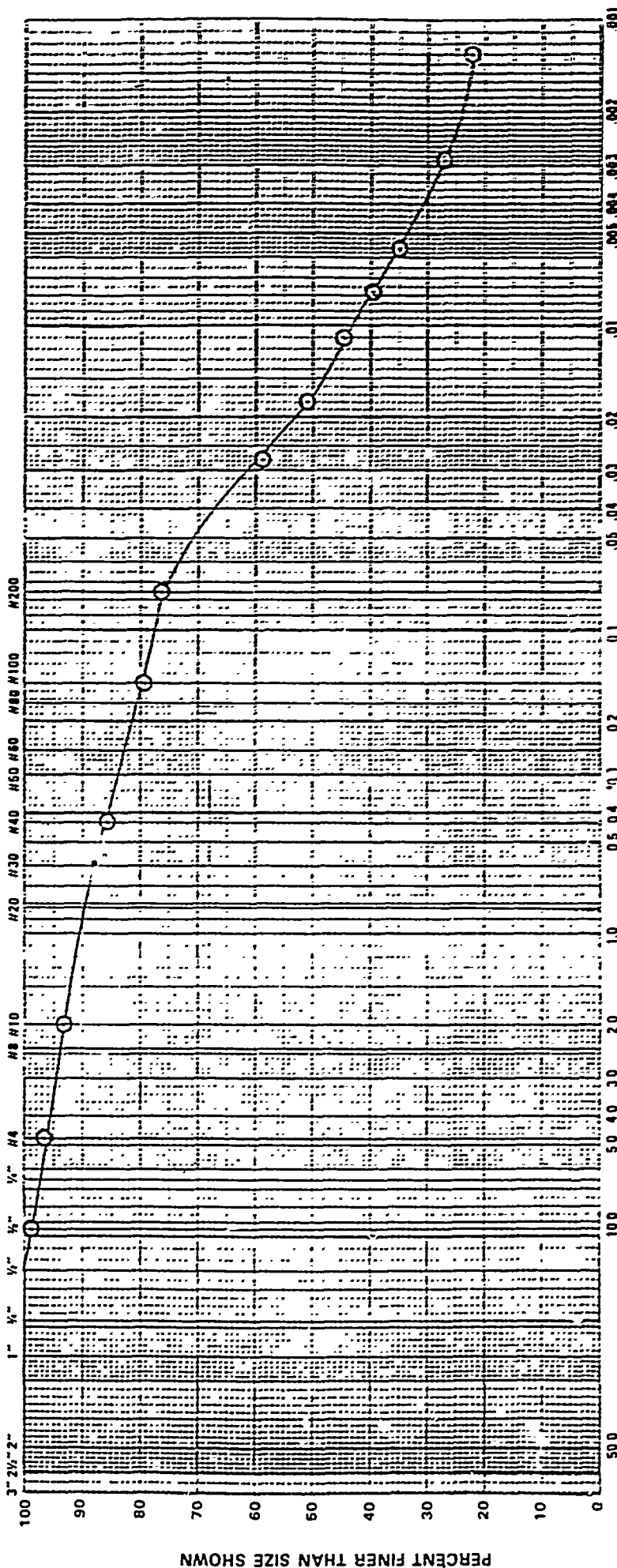
CHECKED BY: \_\_\_\_\_



Foth & Van Dyke and Associates Inc.

## GRAIN SIZE DISTRIBUTION CURVE

U.S. STANDARD SIEVE SIZES



# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19312  
Green Bay, Wisconsin 54307-9312  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86494

DATE: March 20 to 27, 1987

REPORT NO.: 12

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Specifications
3-Inch				
2-Inch				
1½-Inch				
1-Inch				
¾-Inch				
½-Inch	0	0	100	
⅜-Inch	11.3	11.3	88.7	
No. 4	20.0	20.0	68.7	
No. 8				
No. 10	10.2	10.2	58.5	
No. 16				
No. 20				
No. 30				
No. 40	10.2	10.2	48.3	
No. 50				
No. 80				
No. 100	9.3	9.3	39.0	
No. 200	3.4	3.4	35.6	
Pan	35.7	35.7		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 100.1 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-40

IDENTIFICATION: Depth: Surface

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

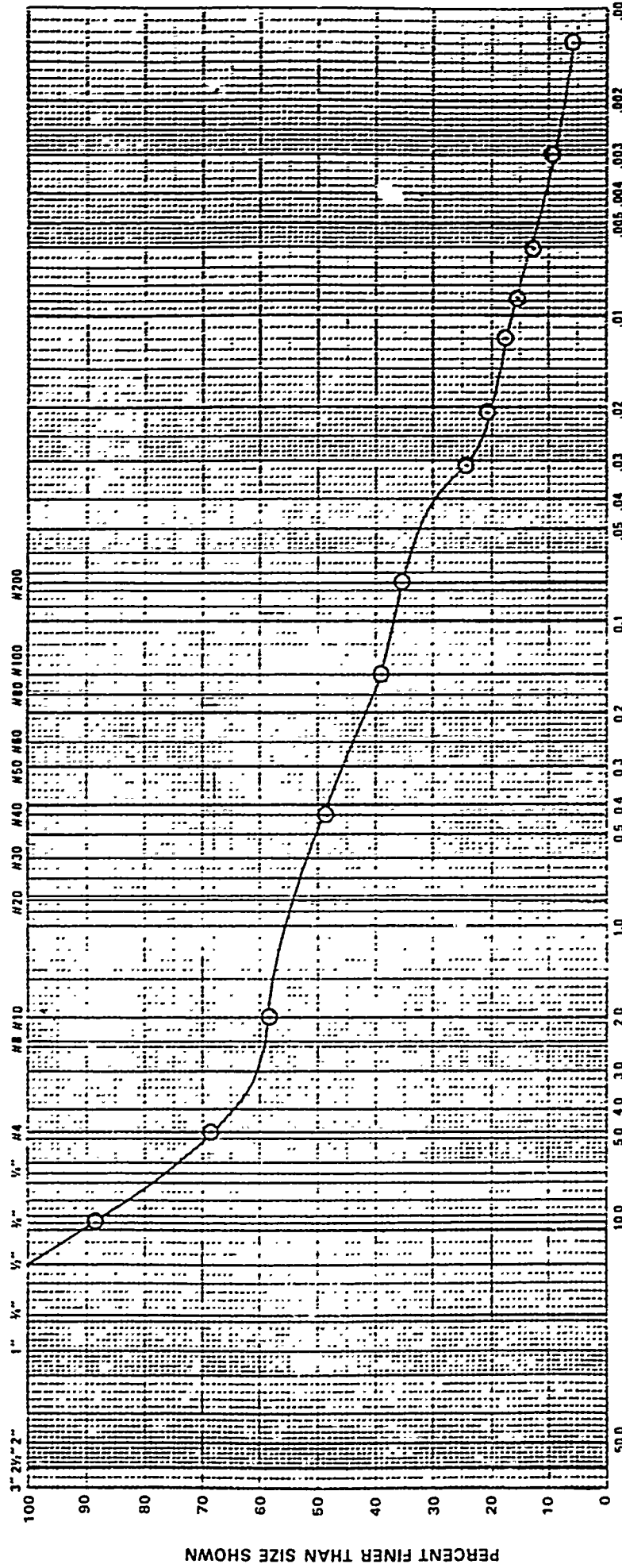
PERCENT PASSING NO. 200 SIEVE 35.7 %

COLOR: 10 YR. 3/2 - Very dark grayish brown

NOTE: Small amounts of asphalt and glass were found in this sample.

CHECKED BY: \_\_\_\_\_

## GRAIN SIZE DISTRIBUTION CURVE



PARTICLE SIZE IN MILLIMETERS					
GRAVEL		SAND			
COARSE	FINE	COARSE	MEDIUM	FINE	
% =	% = 31.3	% = 10.2	% = 10.2	% = 12.6	SILT % = 28.7
					CLAY % = 7.0

FORM H411 SL (2/07)

# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86M94

DATE: March 20 to 27, 1987

REPORT NO.: 13

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Speci- fications
3-Inch				
2-Inch				
1 1/2-Inch				
1-Inch				
3/4-Inch				
1/2-Inch	0	0	100	
3/8-Inch	3.7	1.7	98.3	
No. 4	5.9	2.6	95.7	
No. 8				
No. 10	11.2	5.0	90.7	
No. 16				
No. 20				
No. 30				
No. 40	22.0	9.8	80.9	
No. 50				
No. 80				
No. 100	20.0	9.0	71.9	
No. 200	8.1	3.6	68.3	
152.4 Pan	152.4 .1	68.3		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 223.4 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-41

IDENTIFICATION: Depth 1'

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

PERCENT PASSING NO. 200 SIEVE 68.3 %

COLOR: 10 YR. 3/3 - Dark brown

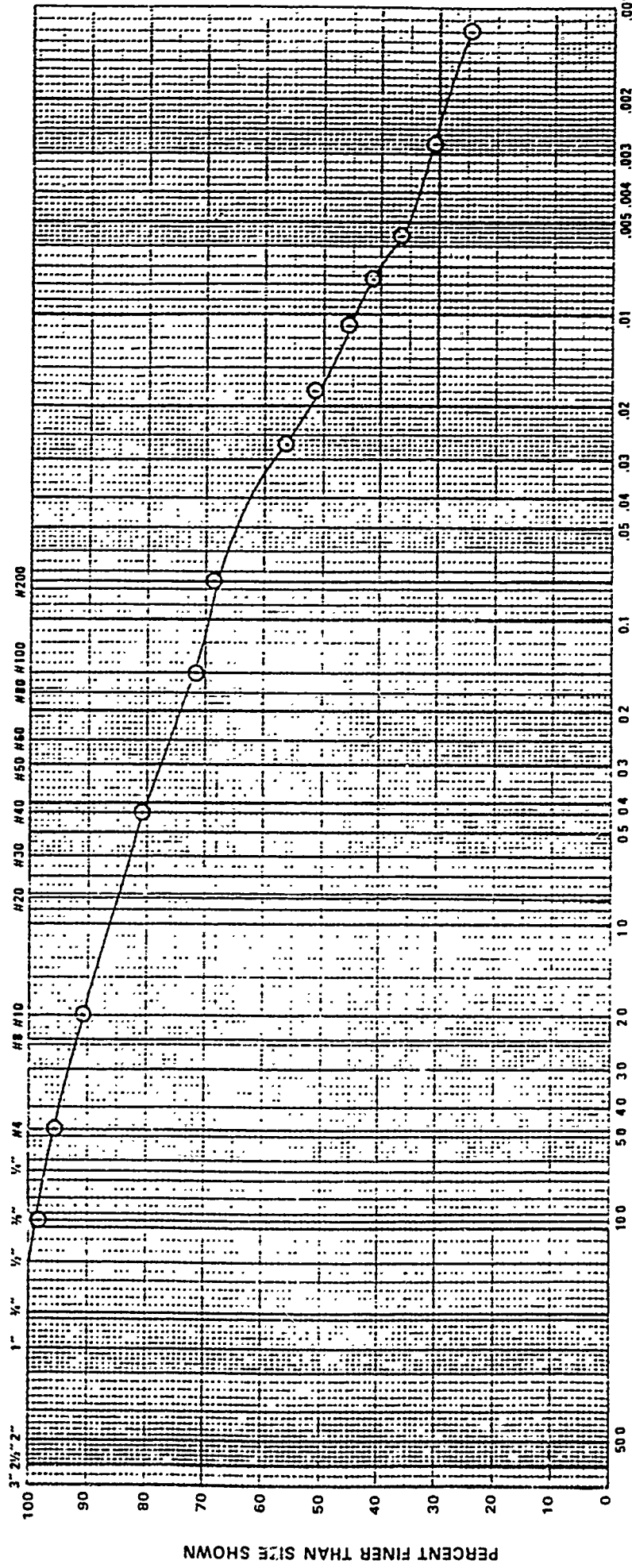
NOTE: Small amounts of asphalt and glass were found in this sample.

CHECKED BY: \_\_\_\_\_

Foth & Van Dyke and Associates Inc.

## GRAIN SIZE DISTRIBUTION CURVE

U.S. STANDARD SIEVE SIZES



# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86M94

DATE: March 20 to 27, 1987

REPORT NO.: 14

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Specifications
3-Inch				
2-Inch				
1 1/2-Inch				
1-Inch				
3/4-Inch				
1/2-Inch	0	0	100	
3/8-Inch	2.7	1.9	98.1	
No. 4	3.6	2.6	95.5	
No. 8				
No. 10	7.2	5.1	90.4	
No. 16				
No. 20				
No. 30				
No. 40	11.9	8.4	82.0	
No. 50				
No. 80				
No. 100	12.1	8.6	73.4	
No. 200	6.1	4.3	69.1	
Pan	97.4	69.1		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 141.0 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-45

IDENTIFICATION: Depth: Surface

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

PERCENT PASSING NO. 200 SIEVE 69.1 %

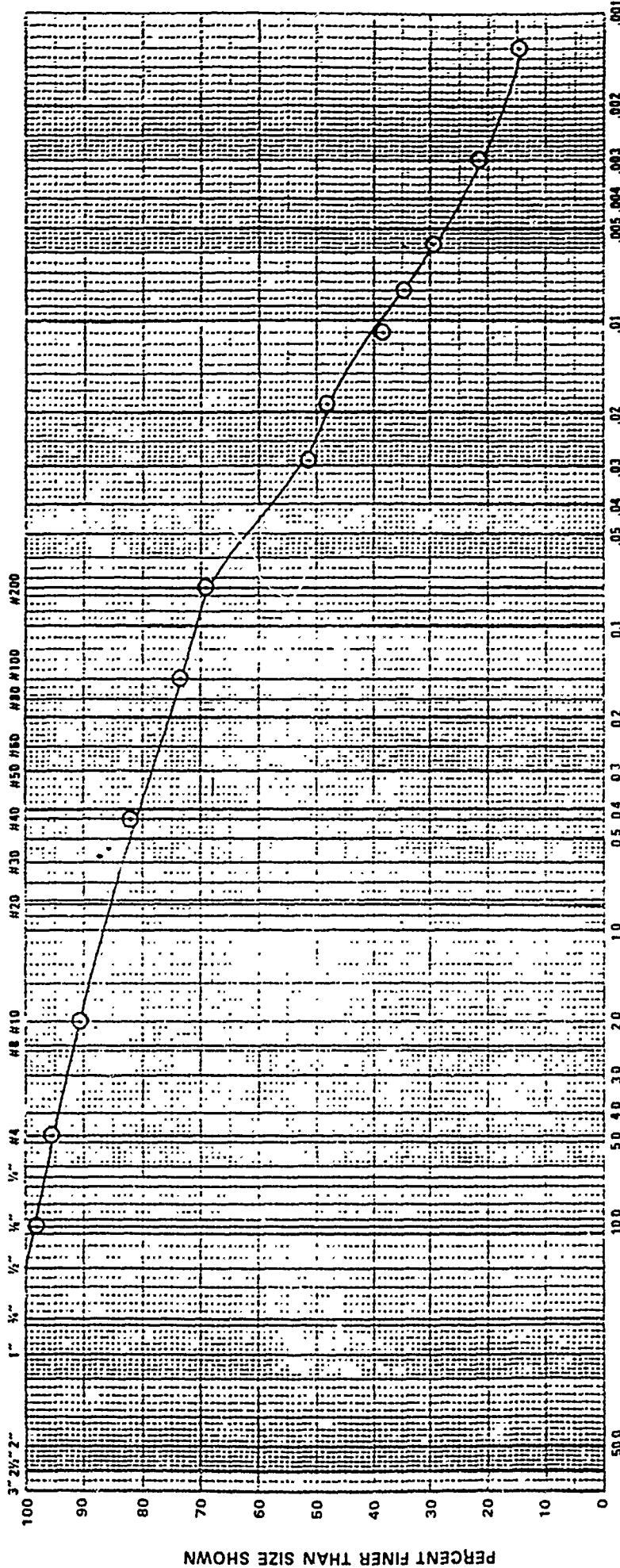
COLOR: 10 YR. 4/4 - Dark yellowish brown

CHECKED BY: \_\_\_\_\_

Foth & Van Dyke and Associates Inc.

## GRAIN SIZE DISTRIBUTION CURVE

U.S. STANDARD SIEVE SIZES



# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86M94

DATE: March 20 to 27, 1987

REPORT NO.: 15

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Speci- fications
3-Inch				
2-Inch				
1 1/2-Inch				
1-Inch				
3/4-Inch				
1/2-Inch				
3/8-Inch	0	0	100	
No. 4	7.9	9.1	90.9	
No. 8				
No. 10	5.6	6.4	84.5	
No. 16				
No. 20				
No. 30				
No. 40	10.3	11.8	72.7	
No. 50				
No. 80				
No. 100	11.1	12.8	59.9	
No. 200	5.6	6.4	53.5	
Pan <sup>46.4</sup> <sub>.1</sub>	46.5	53.4		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 87.0 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-47

IDENTIFICATION: Depth: Surface

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

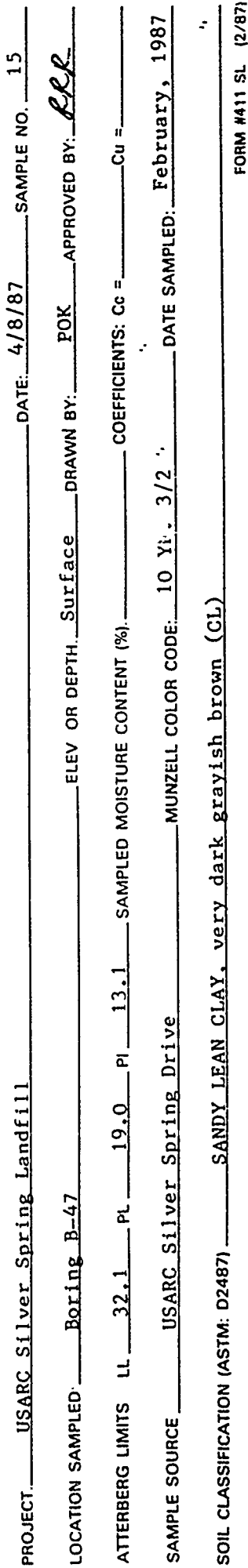
PERCENT PASSING NO. 200 SIEVE 53.5 %

COLOR: 10 YR. 3/2 - Very dark grayish brown

CHECKED BY: \_\_\_\_\_



# GRAIN SIZE DISTRIBUTION CURVE



# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86M94

DATE: March 20 to 27, 1987

REPORT NO.: 16

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Specifications
3-Inch				
2-Inch				
1 1/2-Inch				
1-Inch				
3/4-Inch				
1/2-Inch	0	0	100	
3/8-Inch	4.3	2.7	97.3	
No. 4	.1	.1	97.2	
No. 8				
No. 10	1.7	1.1	96.1	
No. 16				
No. 20				
No. 30				
No. 40	6.6	4.2	91.9	
No. 50				
No. 80				
No. 100	13.9	8.8	83.1	
No. 200	3.4	2.2	80.9	
127.2 Pan	127.4	80.9		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 157.4 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-51

IDENTIFICATION: Depth: Surface

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

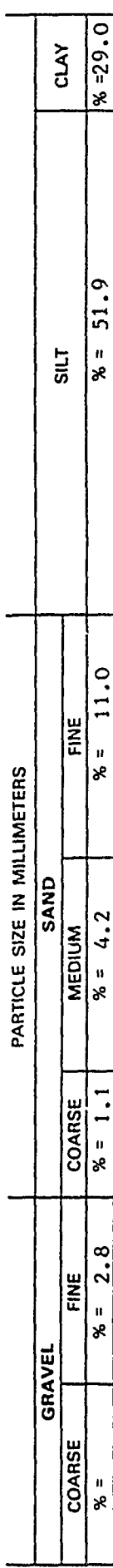
WASHED GRADATION: Yes

PERCENT PASSING NO. 200 SIEVE 80.9 %

COLOR: 10 YR. 2/2 - Very dark brown

CHECKED BY: \_\_\_\_\_

# GRAIN SIZE DISTRIBUTION CURVE



FORM #411 SL (2/87)

# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86M94

DATE: March 20 to April 3, 1987

REPORT NO.: 17

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Specifications
3-Inch				
2-Inch				
1 1/2-Inch				
1-Inch				
3/4-Inch				
1/2-Inch				
3/8-Inch	0	0	100	
No. 4	1.1	.6	99.4	
No. 8				
No. 10	2.9	1.5	97.9	
No. 15				
No. 20				
No. 30				
No. 40	7.1	3.6	94.3	
No. 50				
No. 80				
No. 100	10.6	5.3	89.0	
No. 200	2.5	1.3	87.7	
Pan	175.8	87.9		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 200.0 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-52

IDENTIFICATION: Depth 0.5'

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

PERCENT PASSING NO. 200 SIEVE 87.9 %

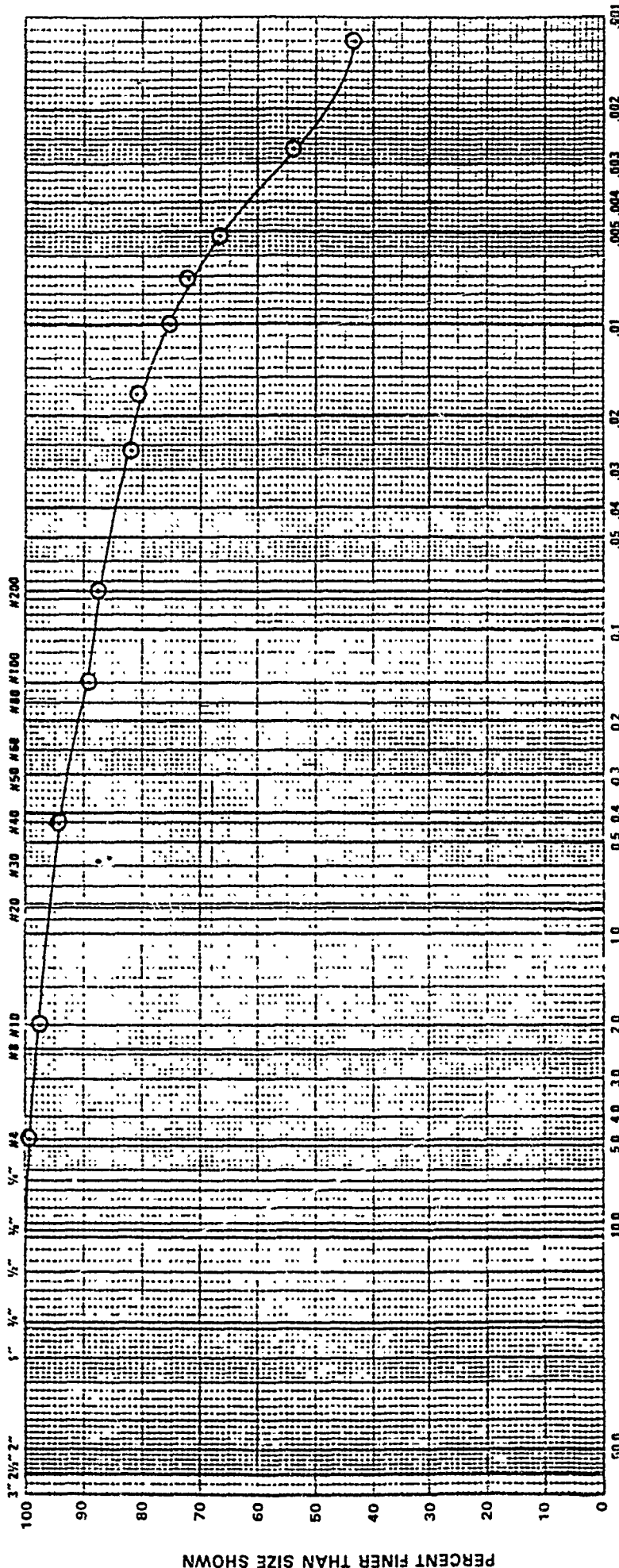
COLOR: 10 YR. 3/3 - Dark brown

CHECKED BY: \_\_\_\_\_

Foth & Van Dyke and Associates Inc.

## GRAIN SIZE DISTRIBUTION CURVE

U.S. STANDARD SIEVE SIZES



PARTICLE SIZE IN MILLIMETERS						
GRAVEL		SAND			SILT	
COARSE	FINE	COARSE	MEDIUM	FINE	CLAY	
% =	% = 0.6	% = 1.5	% = 3.6	% = 6.4	% = 39.9	
					% = 48.0	

# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JCB NO.: 86M94

DATE: March 20 to April 3, 1987

REPORT NO.: 18

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Specifi- cations
3-Inch				
2-Inch				
1 1/2-Inch				
1-Inch				
3/4-Inch				
1/2-Inch				
3/8-Inch	0	0	100	
No. 4	8.4	4.8	95.2	
No. 8				
No. 10	9.0	5.2	90.0	
No. 16				
No. 20				
No. 30				
No. 40	14.8	8.5	81.5	
No. 50				
No. 80				
No. 100	13.9	8.0	73.5	
No. 200	5.8	3.3	70.2	
122.1 Pan	122.1	70.2		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 174.0 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-54

IDENTIFICATION: Depth: Surface

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

PERCENT PASSING NO. 200 SIEVE 70.2 %

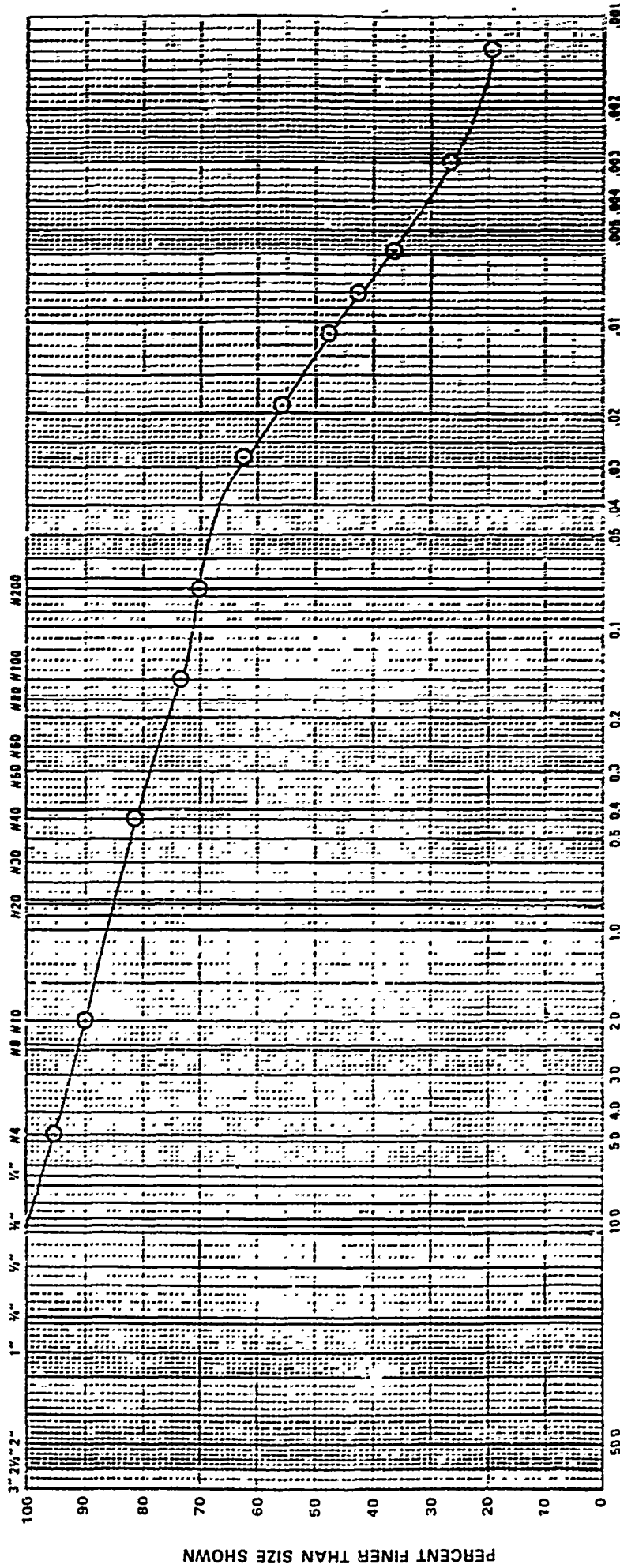
COLOR: 10 YR. 5/4 - Yellowish brown

CHECKED BY: \_\_\_\_\_

Foth & Van Dyke and Associates Inc.

## GRAIN SIZE DISTRIBUTION CURVE

U.S. STANDARD SIEVE SIZES



PARTICLE SIZE IN MILLIMETERS

GRAVEL		SAND		SILT	CLAY
COARSE	FINE	MEDIUM	FINE		
% =	% =	% =	% =	% =	% =
4.8	5.2	8.5	11.3	48.7	21.5

PROJECT USARC Silver Spring Landfill

DATE: 4/10/87 SAMPLE NO.: 18

LOCATION SAMPLED Boring B-54

ELEV. OR DEPTH: SURFACE DRAWN BY: POK APPROVED BY: RRR

ATTERBERG LIMITS LL 26.0 PL 14.2 PI 11.8 SAMPLED MOISTURE CONTENT (%):

COEFFICIENTS:  $C_u$  =

SAMPLE SOURCE USARC Silver Spring Drive

MUNZELL COLOR CODE: 10 YR. 5/4 DATE SAMPLED: February, 1987

SOIL CLASSIFICATION (ASTM: D2487) LEAN CLAY W/SAND, yellowish brown (CL)

# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86X94

DATE: March 20 to April 3, 1987

REPORT NO.: 19

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Specifications
3-Inch				
2-Inch				
1 1/2-Inch				
1-Inch				
3/4-Inch				
1/2-Inch	0	0	100	
3/8-Inch	3.8	1.8	98.2	
No. 4	8.5	4.1	94.1	
No. 8				
No. 10	6.4	3.1	91.0	
No. 16				
No. 20				
No. 30				
No. 40	10.9	5.3	85.7	
No. 50				
No. 80				
No. 100	12.6	6.1	79.6	
No. 200	7.5	3.6	76.0	
Pan 155.7	155.9	75.8		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 205.6 grams

SUBMITTED BY: Janis Kesv of F&VD

SAMPLED FROM: Boring B-56

IDENTIFICATION: Depth 1.5'

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

PERCENT PASSING NO. 200 SIEVE: 75.8 %

COLOR: 10 YR. 3/2 - Very dark grayish brown

CHECKED BY: \_\_\_\_\_



## GRAIN SIZE DISTRIBUTION CURVE



## GRAVEL

PROJECT USARC Silver Spring Landfill

LOCATION SAMPLED Boring B-56

ATTERBERG LIMITS LL 41.0 PL 20.9 PI 20.1

**SAMPLE SOURCE** USARC Silver Spring Drive

LEAN CLAY W/SAND, very dark grayish brown (CL)

DATE: 4/10/87 SAMPLE NO.: 19

DRAWN' BY: POK APPROVED BY: *[Signature]*

COEFFICIENTS:  $C_0 =$  \_\_\_\_\_  $C(1) =$  \_\_\_\_\_

DATE SAMPLED: February, 1987

FORM H411 SL (2/07)

# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86M94

DATE: March 20 to April 3, 1987

REPORT NO.: 20

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Specifi-cations
3-Inch				
2-Inch				
1 1/2-Inch				
1-Inch				
3/4-Inch	0	0	100	
1/2-Inch	6.5	4.6	95.4	
3/8-Inch	2.0	1.4	94.0	
No. 4	4.7	3.3	90.7	
No. 8				
No. 10	5.5	3.9	86.8	
No. 16				
No. 20				
No. 30				
No. 40	10.1	7.1	79.7	
No. 50				
No. 80				
No. 100	13.5	9.5	70.2	
No. 200	6.5	4.6	65.6	
Pan <sup>93.6</sup> <sub>2</sub>	93.8	65.8		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 142.6 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-58

IDENTIFICATION: Depth: Surface

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

PERCENT PASSING NO. 200 SIEVE 65.8 %

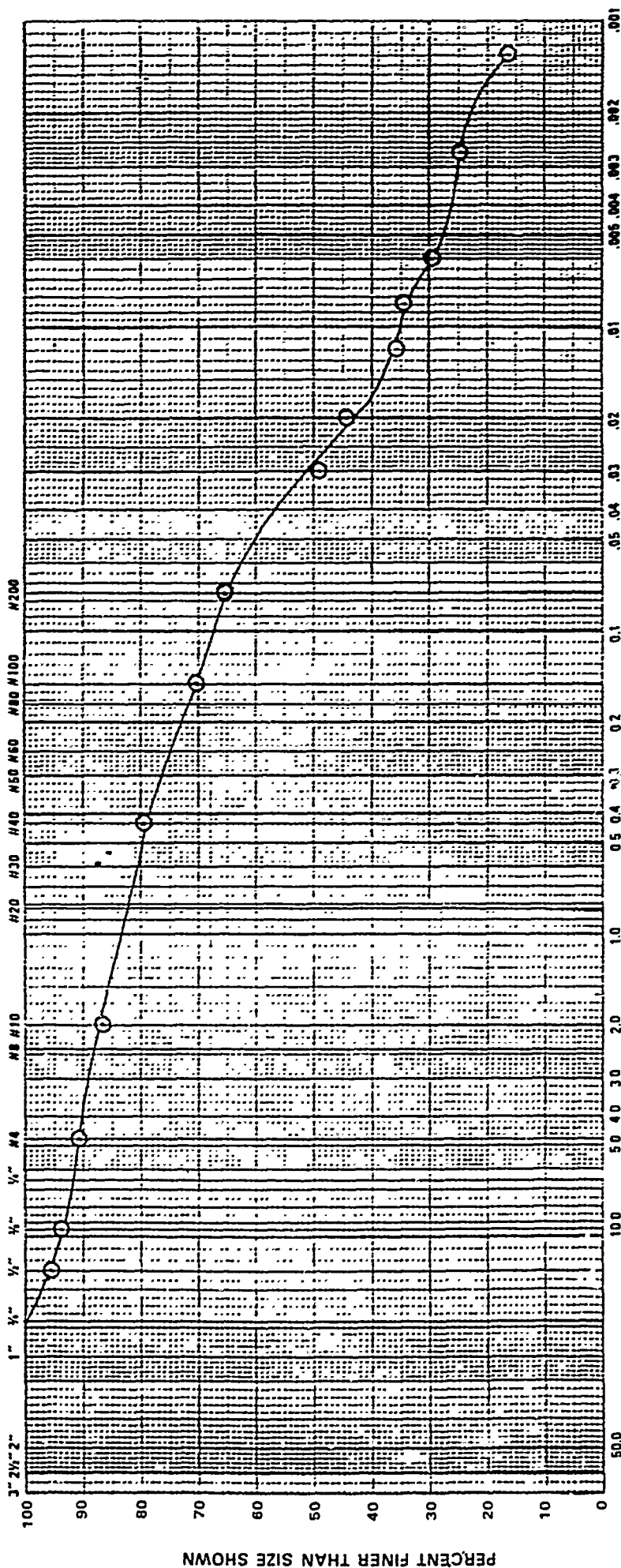
COLOR: 10\_YR. 3/3 - Dark brown

CHECKED BY: \_\_\_\_\_

Foth & Van Dyke and Associates Inc.

## GRAIN SIZE DISTRIBUTION CURVE

U.S. STANDARD SIEVE SIZES



PARTICLE SIZE IN MILLIMETERS

GRAVEL		SAND		SILT		CLAY	
COARSE	FINE	COARSE	MEDIUM	FINE			
% =	% =	% =	% =	% =	% =	% =	% =
	9.3	3.9	7.1	13.9	43.3		22.5

PROJECT USARC Silver Spring Landfill

DATE: 4/10/87

SAMPLE NO.: 20

LOCATION SAMPLED Boring B-58

ELEV. OR DEPTH: Surface

DRAWN BY: POK

APPROVED BY: R.R.R.

ATTERBERG LIMITS LL 43.3 PL 25.0 PI 18.3

SAMPLED MOISTURE CONTENT (%):

COEFFICIENTS: Cc =

Cu =

SAMPLE SOURCE USARC Silver Spring Drive

MUNZELL COLOR CODE: 10 YR. 3/3

DATE SAMPLED: February, 1987

SOIL CLASSIFICATION (ASTM: D2487) SANDY LEAN CLAY, dark brown (CL/ML)

FORM #411 SL (2/87)

# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86M94

DATE: March 20 to April 7, 1987

REPORT NO.: 21

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Specifi- cations
3-Inch				
2-Inch				
1 1/2-Inch				
1-Inch				
3/4-Inch				
1/2-Inch				
3/8-Inch	0	0	100	
No. 4	1.3	.7	99.3	
No. 8				
No. 10	3.7	2.1	97.2	
No. 16				
No. 20				
No. 30				
No. 40	8.0	4.5	92.7	
No. 50				
No. 80				
No. 100	11.5	6.5	86.2	
No. 200	2.5	1.4	84.8	
148.9 Pan	148.9	84.7		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 175.9 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-60

IDENTIFICATION: Depth 2'

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

PERCENT PASSING NO. 200 SIEVE 84.7 %

COLOR: 10 YR. 2/2 - Very dark brown

CHECKED BY: \_\_\_\_\_



# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86M94

DATE: March 20 to April 7, 1987

REPORT NO.: 22

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Speci- fications
3-Inch				
2-Inch				
1 1/2-Inch				
1-Inch				
3/4-Inch				
1/2-Inch				
3/8-Inch	0	0	100	
No. 4	18.2	8.1	91.9	
No. 8				
No. 10	20.4	9.1	82.8	
No. 16				
No. 20				
No. 30				
No. 40	22.0	9.8	73.0	
No. 50				
No. 80				
No. 100	18.8	8.4	64.6	
No. 200	9.5	4.2	60.4	
134.8 Pan	135.2	60.3		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 224.1 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-62

IDENTIFICATION: Depth 0.5'

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

PERCENT PASSING NO. 200 SIEVE 60.3 %

COLOR: 10 YR. 3/2 - Very dark grayish brown

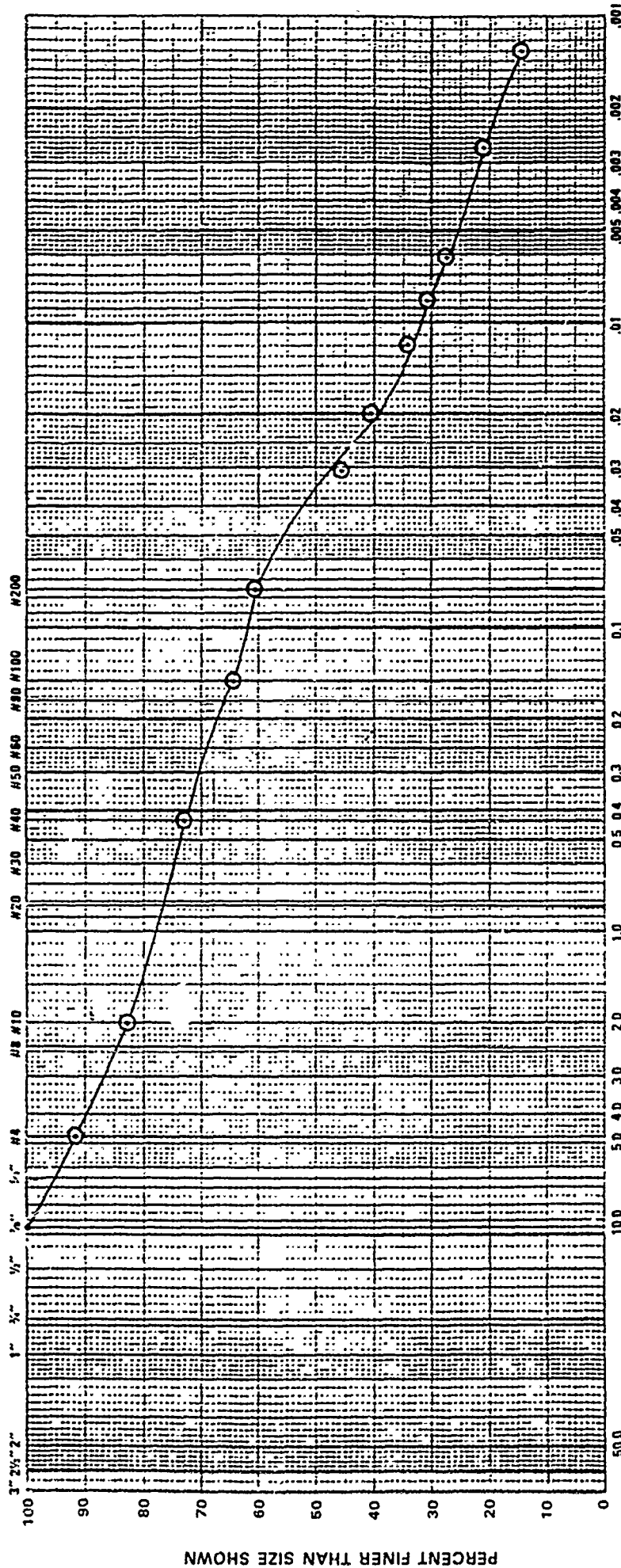
NOTE: Small amounts of metal and glass were found in this sample.

CHECKED BY: \_\_\_\_\_

Foth & Van Dyke and Associates Inc.

## GRAIN SIZE DISTRIBUTION CURVE

U.S. STANDARD SIEVE SIZES



# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86M94

DATE: March 20 to April 7, 1987

REPORT NO.: 23

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Specifications
3-Inch				
2-Inch				
1 1/2-Inch				
1-Inch				
3/4-Inch				
1/2-Inch	0	0	100	
3/8-Inch	3.3	1.3	98.7	
No. 4	4.0	1.6	97.1	
No. 8				
No. 10	6.7	2.7	94.4	
No. 16				
No. 20				
No. 30				
No. 40	12.3	5.0	89.4	
No. 50				
No. 80				
No. 100	20.0	8.1	81.3	
No. 200	12.1	4.9	76.4	
187.5 Pan	187.6	76.3		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 246.0 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-64

IDENTIFICATION: Depth 2'

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

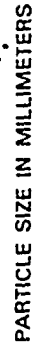
PERCENT PASSING NO. 200 SIEVE 76.3 %

COLOR: 10 YR. 5/4 - Yellowish brown

CHECKED BY: \_\_\_\_\_



# GRAIN SIZE DISTRIBUTION CURVE



**1715.**

% = 22.5

DATE: 4/10/87 SAMPLE NO.: 23

ELEV. OR DEPTH: 2'

POK\_\_\_\_\_APPROVED BY:\_\_\_\_\_

COEFFICIENTS:  $C_c = \underline{\hspace{2cm}}$   $C_u = \underline{\hspace{2cm}}$

MUNZELL COLOR CODE: 10 YR. 5/4

February, 1987

LEAN CLAY W/SAND, yellowish brown (CL)

FORM #411 SL (2/87)

# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86M94

DATE: March 20 to April 7, 1987

REPORT NO.: 24

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Speci- fications
3-Inch				
2-Inch				
1 1/2-Inch				
1-Inch				
3/4-Inch				
1/2-Inch				
3/8-Inch	0	0	100	
No. 4	7.5	3.7	96.3	
No. 8				
No. 10	6.0	3.0	93.3	
No. 16				
No. 20				
No. 30				
No. 40	12.8	6.4	86.9	
No. 50				
No. 80				
No. 100	19.3	9.6	77.3	
No. 200	7.8	3.9	73.4	
Pan <sup>147.1</sup> <sub>.1</sub>	147.2	73.4		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 200.6 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-65

IDENTIFICATION: Depth 1'

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

PERCENT PASSING NO. 200 SIEVE 73.4 %

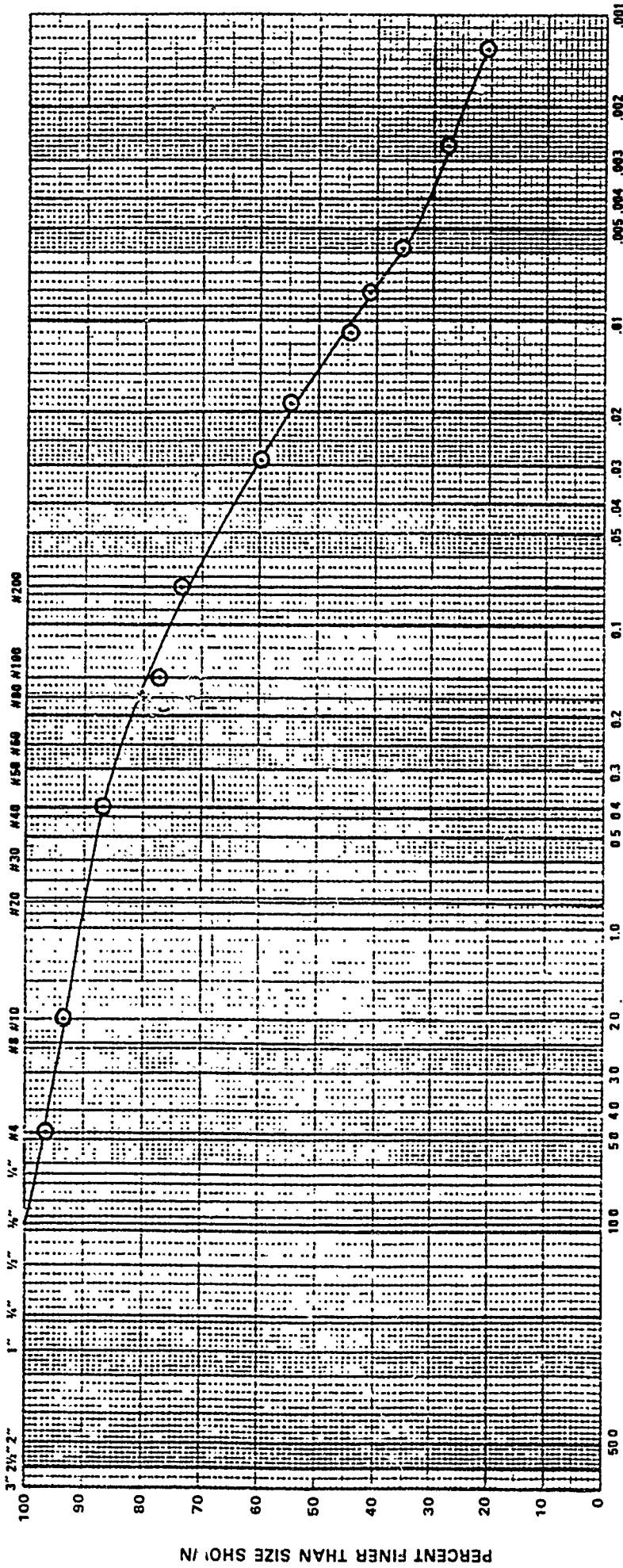
COLOR: 10 YR. 3/4 - Dark yellowish brown

CHECKED BY: \_\_\_\_\_

Foth & Van Dyke and Associates Inc.

## GRAIN SIZE DISTRIBUTION CURVE

U.S. STANDARD SIEVE SIZES



# Foth & Van Dyke

Engineers/Architects

2737 S. Ridge Road  
P. O. Box 19012  
Green Bay, Wisconsin 54307-9012  
414/497-2500

PROJECT NO.: \_\_\_\_\_

JOB NO.: 86M94

DATE: March 20 to April 7, 1987

REPORT NO.: 25

## REPORT OF ANALYSIS OF AGGREGATES

ARCHITECT/ENGINEER: Foth & Van Dyke CONTRACTOR: \_\_\_\_\_

PROJECT: USARC Silver Spring Landfill SOURCE: USARC Silver Spring Drive

REPORT OF TESTS OF: Analysis of Cover Material

Sieve Size or No.	Weight Retained	% Retained	% Passing	Specifi-cations
3-Inch				
2-Inch				
1 1/2-Inch				
1-Inch				
3/4-Inch				
1/2-Inch				
3/8-Inch	0	0	100	
No. 4	2.2	1.2	98.8	
No. 8				
No. 10	5.1	2.7	96.1	
No. 16				
No. 20				
No. 30				
No. 40	10.2	5.4	90.7	
No. 50				
No. 80				
No. 100	16.8	8.9	81.8	
No. 200	14.5	7.7	74.1	
138.7 Pan .3	139.0	74.0		

RECEIVED AT LABORATORY: March 18, 1987

QUANTITY REPRESENTED: 187.8 grams

SUBMITTED BY: Janis Kesy of F&VD

SAMPLED FROM: Boring B-66

IDENTIFICATION: Depth 0.5'

DATE SAMPLED: February, 1987

INTENDED USE: Landfill Cover

WASHED GRADATION: Yes

PERCENT PASSING NO. 200 SIEVE 74.0 %

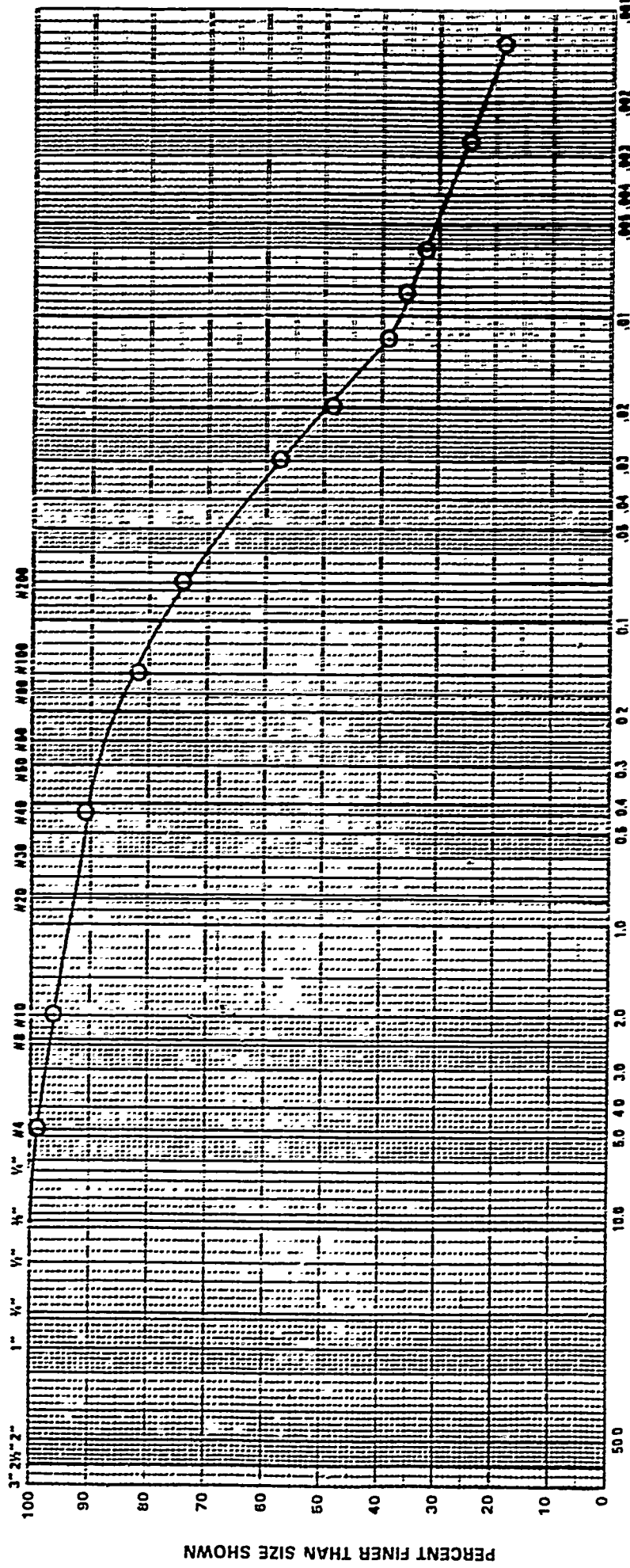
COLOR: 10 YR. 4/4 - Dark yellowish brown

CHECKED BY: \_\_\_\_\_

Foth & Van Dyke and Associates Inc.

## GRAIN SIZE DISTRIBUTION CURVE

U.S. STANDARD SIEVE SIZES



PARTICLE SIZE IN MILLIMETERS

GRAVEL		SAND		SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	
% =	% =	% =	% =	% =	% =
1.2	2.7	5.4	16.7	52.0	22.0

PROJECT: USARC Silver Spring Landfill

DATE: 4/10/87

SAMPLE NO. 25

LOCATION SAMPLED: Boring B-66

ELEV. OR DEPTH: 0.5'

DRAWN BY: POK

APPROVED BY: P.P.R.

ATTERBERG LIMITS LL 30.6 PL 17.0 PI 13.6

SAMPLED MOISTURE CONTENT (%)

COEFFICIENTS: Co =

Cu =

SAMPLE SOURCE USARC Silver Spring Drive

MUNZELL COLOR CODE: 10 YR. 4/4

DATE SAMPLED: February, 1987

SOIL CLASSIFICATION (ASTM: D2487) LEAN CLAY W/SAND, dark yellowish brown (GL)